FIELD EVALUATION OF ALL-SEASON TACTICAL ENGINE OIL OE/HDO-15/40 AT FT. KNOX, KY AND FT. BLISS, TX

INTERIM REPORT
BFLRF No. 217

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Historically, military engine oil specifications covered only single-grade lubricants for use in tactical/combat equipment. Although these lubricants provided excellent operational performance, their use required frequent changes to meet seasonal/climatic conditions. These required changes resulted in the disposal of significant quantities of otherwise usable oil, increased maintenance, and imposed a greater logistics burden. To minimize these problems, requirements for a multiviscosity grade 15W-40 engine oil were developed and the lubricant introduced for military consumption with the issuance of the MIL-L-2104D specification.

The program efforts cover a demonstration and field validation program of the newly introduced grade 15W-40 lubricant. The test, conducted August 1984 through December 1985, involved a wide variety of combat, tactical, and support equipment operated by the 2D Squadron, 6th Cavalry at Fort (Cont'd)

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19. ABSTRACT (Cont'd)

Knox, KY, and the 3D Armored Cavalry Regiment at Fort Bliss, TX. During the test, vehicles accumulated in excess of 1,840,000 miles of operation under ambient conditions ranging from monthly low temperatures of -8°C (18°F) at Fort Knox to monthly high temperatures of 35°C (95°F) at Fort Bliss. Two grade 15W-40, MIL-L-2104D qualified lubricants were employed in the test, one product at each of the test locations. The test lubricants were used in all equipment components, engines, transmissions, hydraulic systems, etc., that required MIL-L-2104 engine oil.

Equipment within the test fleets were monitored in regard to wear performance, frequency of component replacement, and operational characteristics. Comparison of these data with similar information for previous year equipment operation at the test sites showed the 15W-40 oils to provide at least equal and potentially improved wear performance over single-graded lubricants. With the exception of 6V-53N two-cycle diesel engine operated at Fort Knox, no significant variation in engine or transmission replacements were observed between the baseline and validation test periods. A higher replacement rate for the 6V-53N engine was noted with the Fort Knox data. A cause for the higher rate could not be determined. Operationally, several problems were reported early in the test period. Investigation of these problems revealed that only one slightly slower depression rate for the hydraulically actuated boom on the M88 recovery vehicle was lubricant related. Overall, the grade 15W-40 products demonstrated satisfactory and equivalent performance to single-graded oils. The oil was well received by both operators and maintenance personnel who noted that the grade 15W-40 products significantly reduced logistics burden by having only one grade product to requisition, store, and transport to the field.

EXECUTIVE SUMMARY

Problems and Objectives: From its introduction in the early 1940's, the MIL-L-2104 engine oil specification covered only single-viscosity grade lubricants for use in Army ground equipment. The use of these single-viscosity grade lubricants required frequent lubricant changes solely in response to changes in seasonal/climatic conditions, which resulted in the disposal of significant quantities of otherwise usable oil, increased equipment maintenance, and produced a higher level of logistics burden. To solve the seasonal/climatic utilization problems, the U.S. Army initiated a program directed at the development and testing of heavy-duty multiviscosity diesel engine oils. The Army efforts resulted in the April 1983 issuance of Specification MIL-L-2104D, which introduced lubricants of improved quality and a multiviscosity, grade 15W-40 product into the Army inventory system. The program discussed in this report served as a final field demonstration of the MIL-L-2104D products and particularly the 15W-40 grade lubricant.

Importance of Project: While considerable laboratory testing had been conducted with the MIL-L-2104D lubricants and major field tests conducted with various multiviscosity lubricants, no substantial field testing had been conducted with the 15W-40 grade lubricant. Since laboratory and small-scale testing cannot uncover all problems that may be encountered in field service, this large-scale demonstration program was important in uncovering any problems that may occur and in convincing the user operating units of the benefits of the multiviscosity oils.

Technical Approach: The demonstration program involved a wide range of combat, tactical, and support equipment operated by units in Fort Knox, KY and Fort Bliss, TX. The program was conducted August 1984 through December 1985 at these two bases because of the widely varying climatic conditions and temperatures. During the test, vehicles accumulated in excess of 1,840,000 miles of operation under ambient conditions ranging from monthly low temperatures of -8°C to high temperatures of 35°C. The equipment within the test fleets was monitored in regard to wear performance, frequency of component replacement, and operational characteristics. These data were compared with similar information for previous year equipment operation when only single-grade lubricants were used.

Accomplishments: This demonstration program showed the 15W-40 oils to provide at least equal and potentially improved wear performance over single-graded lubricants. With the exception of a 6V-53N two-cycle diesel engine operated at Fort Knox, no significant variations in engine or transmission replacements were observed between the baseline and validation test periods. A higher replacement rate for the 6V-53N engine was noted with the Fort Knox data. A cause for the higher rate could not be determined. Overall, the grade 15W-40 products demonstrated satisfactory and equivalent performance to single-graded oils. The oil was well received by both operators and maintenance personnel who noted that the grade 15W-40 products significantly reduced logistics burden by having only one grade product to requisition, store, and transport to the field.

Military Impact: The use of a single multiviscosity oil in military tactical/combat equipment in lieu of numerous single-grade lubricants will decrease maintenance requirements and the logistics burden resulting in increased readiness for the military's combat/tactical fleet and support equipment. The reduced maintenance will also minimize used lubricant disposal into the environment.

FOREWORD/ACKNOWLEDGEMENTS

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Acknowledgement is given to Mr. M.E. LePera, STRBE-VF, Fort Belvoir, VA, for his participation, encouragement, and support. Also acknowledged are Ms. Lisa Boley, Material Readiness Support Activity (MRSA), Lexington, KY and Mr. Charles Flores, Kelly Air Force Base, San Antonio, TX for their assistance and support in providing magnetic computer tapes containing the results of Army Oil Analysis Program (AOAP) Laboratory tests and analyses of used oil samples received from the test organizations. Also Mr. Edwin A. Frame of Belvoir Fuels and Lubricants Research Facility (SwRI) is acknowledged for his assistance in interpretation of the used oil analyses.

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I. BACKGROUND

From its introduction in the early 1940's, the MIL-L-2104 engine oil specification (1)* covered only single-viscosity grade lubricants for use in Army ground equipment. Although these lubricants provided excellent operational performance, their use required frequent lubricant changes solely in response to changes in seasonal/climatic conditions. These lubricant changes resulted in the disposal of significant quantities of otherwise usable oil, increased equipment maintenance, and produced a higher level of logistics burden. To minimize these problems, some operating units attempted to use the single-grade products under other than recommended seasonal/climatic conditions. Although occasionally successful, these attempts often resulted in operational problems and equipment malfunctions.

To solve seasonal/climatic utilization problems, the Army initiated a program directed at the development and testing of heavy-duty, multiviscosity diesel engine oils. It was determined that an all-season oil of this type would improve oil utilization, reduce equipment maintenance, elevate vehicle readiness, reduce logistic support requirements, and enhance interoperability with NATO allies. The program involved extensive laboratory bench and engine dynamometer testing (2) and was supported by pilot field testing (3-5) of various multigraded products. The program confirmed the feasibility of using multiviscosity engine lubricants in Army ground equipment and resulted in the April 1983 issuance of Specification MIL-L-2104D (6), which introduced lubricants of improved quality and a multiviscosity, grade 15W-40 product into the Army system.

II. INTRODUCTION

While considerable laboratory testing had been conducted with the MIL-L-2104D lubricants (7) and major field tests conducted with various multiviscosity lubricants, no substantial field testing had been conducted with the 15W-40 grade. As a final field demonstration of the MIL-L-2104D products, and particularly the 15W-40 grade, a field validation test was initiated.

* Underscored numbers in parentheses refer to the list of references at the end of this report.

III. EQUIPMENT AND TEST PROCEDURES

The appropriate personnel at TRADOC (8) and FORSCOM (9) were contacted and briefed on the planned demonstration program. Based on their guidance, Fort Bliss, TX and Fort Knox, KY were selected as test sites. Staff at both sites were then briefed, and the program test plans (Appendix A) were reviewed and modified as appropriate.

Both sites in the field validation program were chosen because of the annual ambient temperature ranges associated with their geographic locations and because each had a desirable combat/tactical vehicle and equipment mix to demonstrate the effectiveness of the MIL-L-2104D oil. An additional consideration was the different mission and training activities of the two organizations.

The field validation program was initiated in July 1984. This program initially involved only B Troop, 1st Squadron, 3D Armored Cavalry Regiment (B/1/3) at Fort Bliss, TX and replaced MIL-L-2104C (10) single-grade oils with a MIL-L-2104D 15W-40 grade oil in all vehicles and equipment. By December 1984, the entire 3D ACR was authorized to convert to the test 15W-40 oil. Also added to the field validation program at that time was the 2nd Squadron, 6th Cavalry Regiment (2/6th Cav.) at Fort Knox, KY.

A. Test Lubricants

The test lubricants selected for use at Fort Knox and Fort Bliss were qualified MIL-L-2104D, OE/HDO-15/40, grade lubricants and were produced by separate companies using different additive technologies. Oil A contained a detergent-dispersant system that was primarily magnesium-based with a minor amount of calcium, while Oil B was primarily calcium-based with a lesser amount of magnesium. TABLE 1 describes the test oils and their properties. The initial supply of oil was distributed to the 3D ACR and the 2/6th Cavalry as well as the Directorate of Industrial Operations (DIO) Maintenance Division at Fort Knox, KY. It was necessary to provide the test oil to the DIO maintenance division at Fort Knox because any engine or transmission turned in for repair was directly exchanged. After repair, the engine or transmission would be in a common

TABLE 1. Test Lubricant Properties

Description	ASTM Method No.	Ft. Knox, KY Oil A	Ft. Bliss, TX Oil B
Specification		MIL-L-2104D	MIL-L-2104D
Grade		15W-40	15W-40
Properties			
Viscosity, cSt			
at 40°C	D 445	107.5	99.8
at 100°C	D 445	13.7	13.4
Viscosity Index	D 2270	126	133
VII		OCP*	OCP
TAN	D 664	2.9	2.2
TBN	D 664	7.0	5.5
Pour Point, °C	D 97	-24	-29
Flash Point, °C	D 92	221	210
Sulfated Ash, %	D 874	0.77	0.99
Elements, ppm			
Nitrogen	XRF	560	450
Barium	ICP	<1	6
Sulfur	XRF	5,100	5,600
Magnesium	AA	1,500	600
Calcium	AA	300	1,500
Phosphorous	Modified Oronite	1,100	1,300

* OCP = Olefin copolymer.

replacement pool. Then the next organization turning in a like item for repair would receive the stored item. Thus, providing oil to the DIO would ensure that engines returned to the 2/6th Cavalry were charged with the test oil. This procedure also meant that every engine rebuilt or repaired at the DIO facility would be recharged with the 15W-40 oil. This course of action was agreed upon at the initial liaison/coordination meeting at Fort Knox because it was believed that no harm would result to other units that might receive the engines or transmissions and to ensure the integrity of the validation program.

B. Test Fleets

With the exception of the hydraulic system of a John Deere JD-410 tractor, backhoe, all vehicles and equipment within the test units requiring the use of MIL-L-2104C single-viscosity oils were included in the field validation program.

Appendix B shows the vehicles and equipment on hand in each test unit at the start of the program. Also shown are the components associated with each end item and whether or not the components were charged with the 15W-40 oil. The hydraulic system of the JD-410 was excluded at the request of the responsible maintenance warrant officer because of a John Deere Company requirement that only John Deere's proprietary hydraulic oil could be used.

The number of vehicles on test varied because of normal attrition due to mechanical failures, aging equipment, and new vehicle introductions and equipment requirements. Thus, some of the vehicles did not complete the test, while other vehicles were added during the test.

C. Fleet Operations

The actual length of testing varied between the two test locations. Fort Knox testing covered the period 1 January 1985 through 31 December 1985 and involved all components of the 2/6th Cavalry Squadron.

Testing at Fort Bliss covered two operational periods. Initial testing was conducted from 15 August 1984 through 31 December 1984 and utilized vehicles assigned to B Troop, 1st Squadron, 3D Armor Cavalry Regiment (B/1/3). Starting 1 January 1985, the entire 3D ACR, including assigned and attached units, was incorporated into the program. Testing at Fort Bliss was terminated 30 September 1985.

Conversion of equipment to the multigrade oil was phased in over the first several weeks of the test. At Fort Knox, this conversion was completed by mid January. However, the Commercial Utility Cargo Vehicles (CUCV) at Fort Knox were not included in the test until March 1985 due to concerns over invalidating the vehicle warranty. The manufacturer of this equipment was reluctant to extend warranty coverage when using the 15W-40 grade oil. Meetings were held between Belvoir RDE Center, TACOM and the manufacturer and the problem was eventually resolved.(11) Conversion of the CUCVs was initiated on 29 January 1985. At Fort Bliss, all vehicles operated by B Troop were converted by the August 1984 start date. Conversion of the regiment to test lubricant was completed over a 5-week period ending 7 February 1985.

IV. RESULTS OF TEST

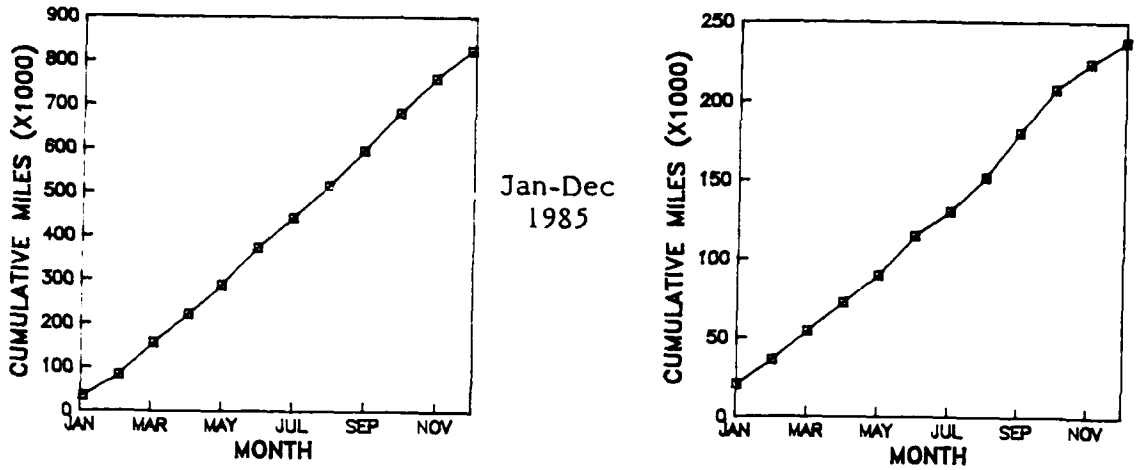
A. Vehicle Operational Data

Operational data were reported monthly at both test sites. At Fort Knox, the operational data were gathered and consolidated at the Squadron S-4 office. The data were reported in the form of a Vehicle/Operator Density Report, which contained vehicle nomenclature, Army designator, serial number, monthly and cumulative mileage, hours of operation, gallons of fuel added, and for the duration of the test, quarts of oil added. At Fort Bliss, a special form was produced (DA FORM 2496) and completed by each individual unit in the regiment. The forms contained vehicle nomenclature, Army designator, monthly mileage, hours of operation, gallons of fuel added, and quarts of oil added.

All vehicles and equipment were operated in accordance with normal mission and training activities. Although both test locations involved cavalry units, actual operations varied. Operations of tracked and wheeled vehicles at Fort Knox were generally more uniform from month to month throughout the test period than those of the squadrons assigned to the 3D ACR at Fort Bliss as shown in Figs. 1 and 2. The wide differences in cumulative mileages occurred because of the units' differing missions. The 2/6th Cavalry at Fort Knox is assigned to the Armor School, which requires year round operations to support the school's training mission. The 3D ACR Squadron at Fort Bliss had less frequent operations since its goal is to maintain proficiency in supporting the regiment's combat mission. Fig. 2 illustrates that a training exercise during February 1985 accounted for the majority of mileage accumulation during the period shown. Fig. 3 shows the cumulative monthly miles for tracked and wheeled vehicles for B/1/3. Operational data for vehicles and equipment for each test organization, categorized by engine type, are summarized in TABLES 2 through 5.

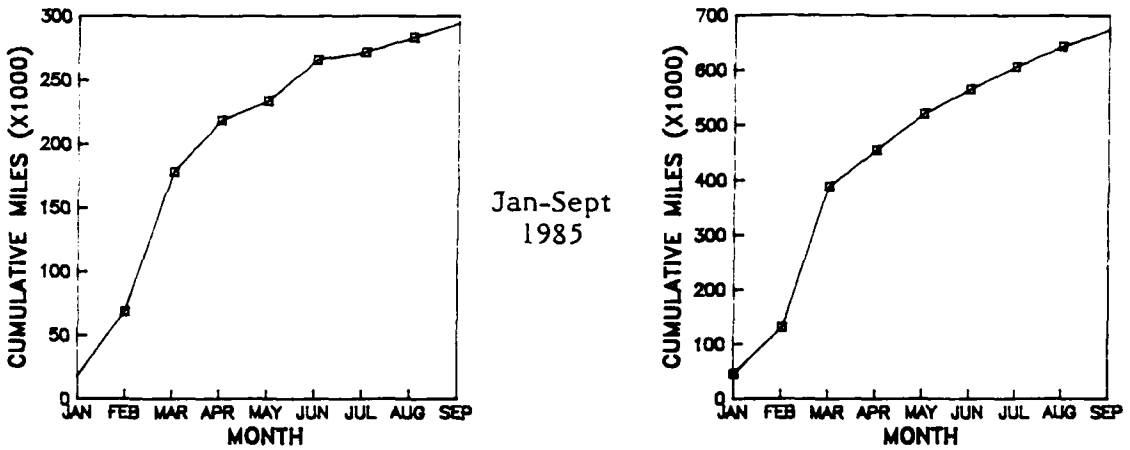
Operational data were accumulated under a wide variation of temperatures as demonstrated by Fig. 4, 5, and 6.

The ambient temperature at Fort Knox dropped as low as -15°F (-26°C) for a brief period, with winter temperatures routinely in the range of 20°F (-7°C) to 30°F



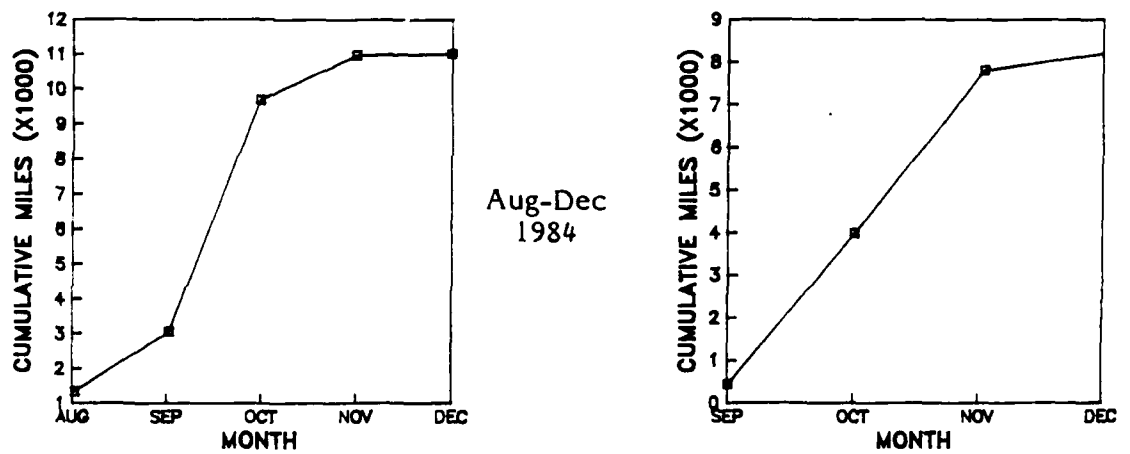
a. Track Vehicles b. Wheel Vehicles

Fig. 1. Monthly cumulative miles at Fort Knox, KY



a. Track Vehicles b. Wheel Vehicles

Fig. 2. Monthly cumulative miles at Fort Bliss, TX



a. Track Vehicles b. Wheel Vehicles

Fig. 3. Monthly cumulative miles in B Troop, 1st Squadron 3D ACR, Fort Bliss, TX

TABLE 2. Operational Data* for Wheel and Track Vehicles at Fort Knox, KY
(1 January 1985 through 31 December 1985)

Engine Type	Vehicle Count	Total Miles	Total Hours	Fuel, Mile/ Gal	Oil, Mile/ Qt	Vehicle Application
L 141	71	357,133	-	11.2	1006	M151
GM 6.2L	63	272,841	-	9.2	5246	M998, M1008, M1009, M1010
Chrys 318	3	4,085	-	9.9	-	M880, M886
LD-465-1	29	139,066	10,352	5.8	340	M35, M49
LDS-465-1	7	16,438	1,435	5.4	294	M52, M54
NHC 250	8	33,663	1,895	6.0	488	M813, M816, M923, M932
DD 6V-53	18	53,603	7,644	1.5	55	M106, M113, M577
DD 6V-53T	22	26,206	-	1.8	78	M551
VTA-903T	26	25,183	6,292	1.1	65	M3
AVDS-1790	81	132,413	18,441	0.5	11	M60, M88

* Data extracted from monthly vehicle/operator density report.

TABLE 3. Operational Data* for Wheel and Track Vehicles From B Troop, 1st Squadron, Fort Bliss, TX
(15 August 1984 through 31 December 1984)

Engine Type	Vehicle Count	Total Miles	Total Hours	Oil, Mile/Qt	Vehicle Application
L 141	4	5013	-	1253	M151
LD-465-1	4	3313	149	414	M35
DD 6V-53	16	6565	657	43	M106, M113, M220, M577
AVDS-1790	13	4449	444	0.9	M60, M88

* No fuel data provided

TABLE 4. Operational Data for Wheel and Track Vehicles at 3D ACR, Fort Bliss, TX

(1 January 1985 through 30 September 1985)

Engine Type	Vehicle Count	Total Miles	Total Hours	Fuel, Mile/gal.	Oil, Mile/qt.	Vehicle Application
L 141	115	278,085	-	11.0	661	M151
GM 6.2L	87	117,535	-	9.9	700	M1008, M1009, M1028
Chrys 318	33	23,208	-	9.9	595	M880, M883, M884, M885, M886, M887, M890
DD 353	34	16,194	-	5.8	82	M561, M792
LD-465-1	199	131,526	9951	4.5	186	M275, M35, M36, M49, M50, M109
LDS-465-1	91	65,071	4733	5.7	115	M52, M54, M55, M543
NHC-250	50	42,115	2490	3.4	143	M813, M814, M816, M817, M818, M936
Cummins V8 300	2	661	54	3.5	661	M123
DD 8V-92T	44	11,885	889	2.3	228	M911, M977, M978
MAN D-2840	3	441	67	2.3	74	M1015
DD 6V-53	269	175,351	21,373	2.2	30	M106, M113, M220, M548, M577
DD 8V-71T	18	9,777	1,020	1.5	41	M109, M578
AVDS-1790	188	112,636	13,315	0.5	14	AVLB, M60, M728, M88

TABLE 5. Operational Data for Ground Support Equipment at Fort Bliss, TX

Model	Equipment Count	Engine	Total Hours	Fuel	Fuel, Gal/hr	Oil, Hr/qt
Grader FT F1500	1	DD 6V-53	59	Diesel	2.7	4
Tractor FT D7F	2	Cat Trac D333CT	182	Diesel	4.2	2
Tractor WHL G40C	4	Chrysler 931-1631-1	90	Mogas	0.9	8
Tractor BH JD410	1	JD-4-2-19DT-03	105	Diesel	1.2	26
Loader Scoop 645M	2	Allison Chambers 3500	178	Diesel	1.7	-
Lift Fork M4K	4	Case 207D	214	Diesel	0.6	36
Lift Fork MLT6CH	2	DD 4-53N	88	Diesel	2.3	22
Lift Fork M10A	6	IH DT-466B	424	Diesel	5.5	38
Heater 250K	2	MIL-STD-1A08-1,2,3	218	Mogas	1.2	31
Compressor 14M250	4	Continental JD 403	28	Diesel	0.4	7
Pump P100	5	MIL-STD-2A016-1,2,3	51	Mogas	0.3	51
Pump P125	2	MIL-STD-2A016-1,2,3	2	Mogas	1	-
APU JHGV7.5	2	Wisconsin Motor MVH4D	30	Mogas	0.5	5
Gen St 1.5 kW	18	MIL-STD-2A016-1,2,3	2419	Mogas	0.2	55
Gen St 3 kW	13	MIL-STD-4A032-1,2	610	Mogas	0.3	76
Gen St 5 kW	9	MIL-STD-4A032-1,2	1133	Mogas	1.5	40
Gen St 4.2 kW	12	MIL-STD-4A032-1,2	580	Mogas	0.4	10
Gen St 10 kW	11	MIL-STD-4A084-2,3	540	Mogas	1.5	39
Gen St 15 kW	1	Hercules D198	83	Diesel	1.1	-
Gen St 30 kW	4	Hercules D298	543	Diesel	1.4	181
Gen St 60 kW	5	Allison Chambers 3500 or Cummins C180	461	Diesel	1.3	66

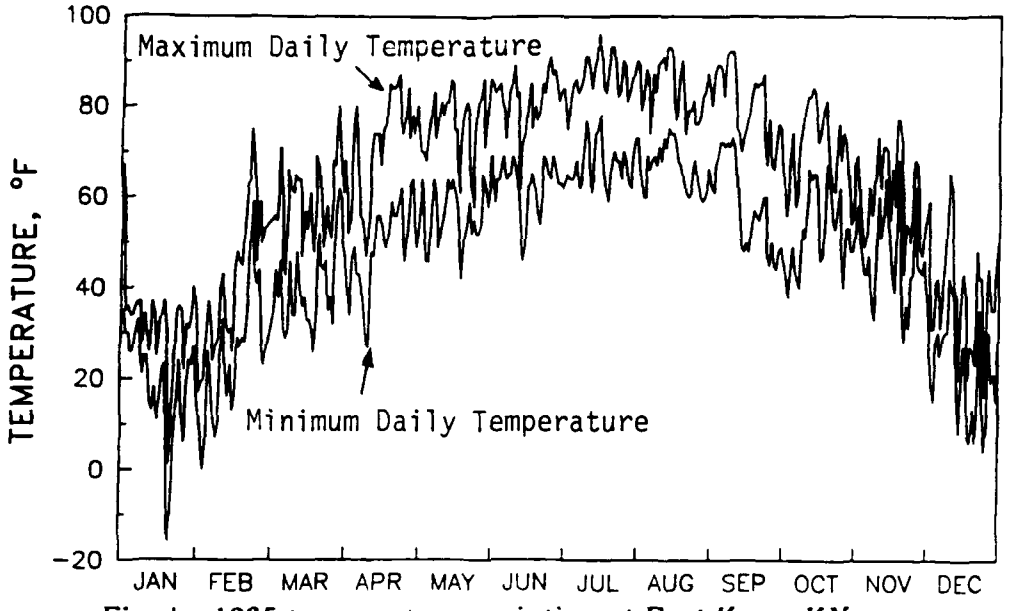


Fig. 4. 1985 temperature variation at Fort Knox, KY

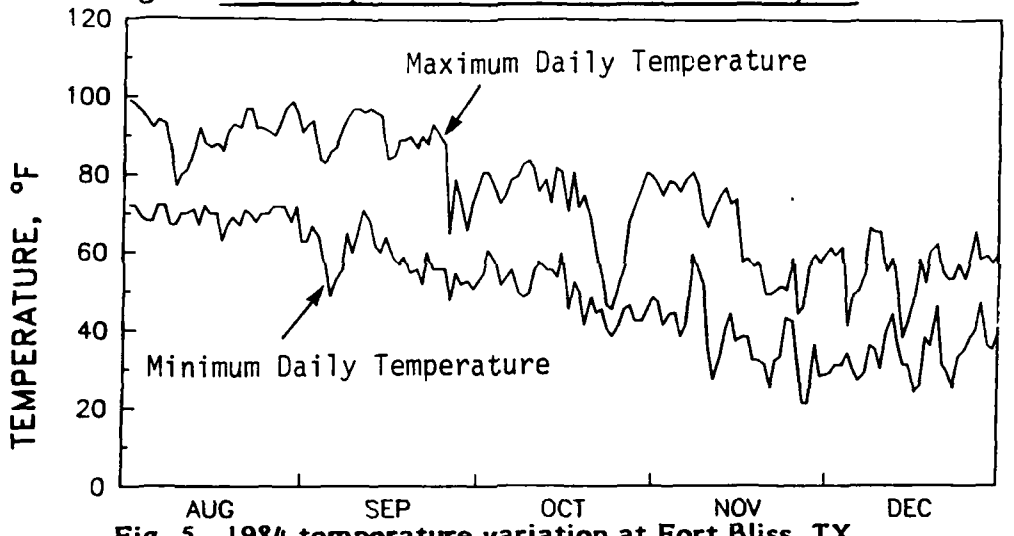


Fig. 5. 1984 temperature variation at Fort Bliss, TX

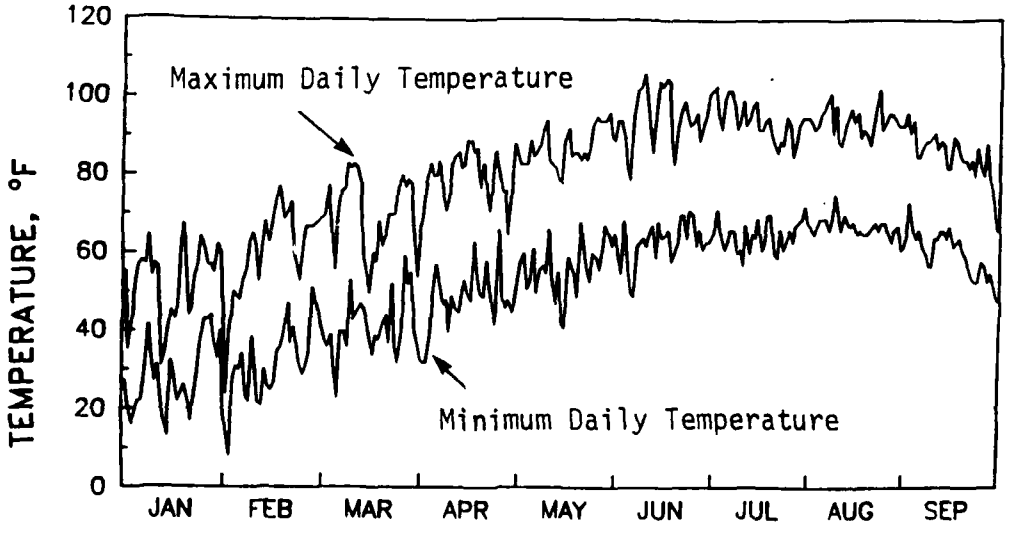


Fig. 6. 1985 temperature variation at Fort Bliss, TX

(1°C). During the summer months, Fort Bliss daily highs routinely exceeded 100°F (38°C). However, the majority of the training activity at Fort Bliss. which accounted for most of the vehicle use, occurred during February 1985 with ambient temperatures in the 40°F (4°C) to 60°F (16°C) range as shown in Fig. 7. The wheeled vehicles of the 2/6th Cavalry at Fort Knox operated 138,000 miles more during the August-December 1985 period than in the same time frame in 1984 (Fig. 8). The mileage accumulated by tracked equipment was virtually equal from year to year. As shown later in the report, this increase in usage of wheeled equipment during the period when the test oil was in use clouds the analysis of oil usage and equipment maintenance. Other than B/1/3, no operational data are available during 1984 for the 3D ACR at Fort Bliss.

Detailed operational test data are included in Appendix C. The operational test data are divided into three groups, based on whether portions of the data were not reported. In many cases, data were either missing or obviously erroneous. Any missing data limited the calculations that could be made for that vehicle. Each vehicle record reported, if complete, would contain the vehicle mileage, fuel and oil added, and total hours of operation. From these data, the vehicle fuel and oil consumption and average miles per hour operated over the duration of the test were calculated. These data were used to compile the summaries labeled "Equipment Reporting Data for Miles, Hours, Fuel, and Oil, as Applicable, per Month".

If, however, the fuel additions, oil additions or operating hours were not reported, then these particular usage rates could not be calculated for that vehicle. As an example, if the data for a vehicle did not contain values for fuel added, then the miles per gallon of fuel could not be calculated; however, the oil consumption and mileage accumulation rates would be valid.

In order to use this partial data, a separate tabulation was calculated entitled "Equipment Reporting Data for Miles/Gal, Miles/Hr, Miles/Qt, Hr/Gal, and Hr/Qt" and reported in Appendix C.

If a vehicle had missing fuel and oil addition data, or if the vehicle mileage or hours of operation were not reported, then the usage rates could not be deter-

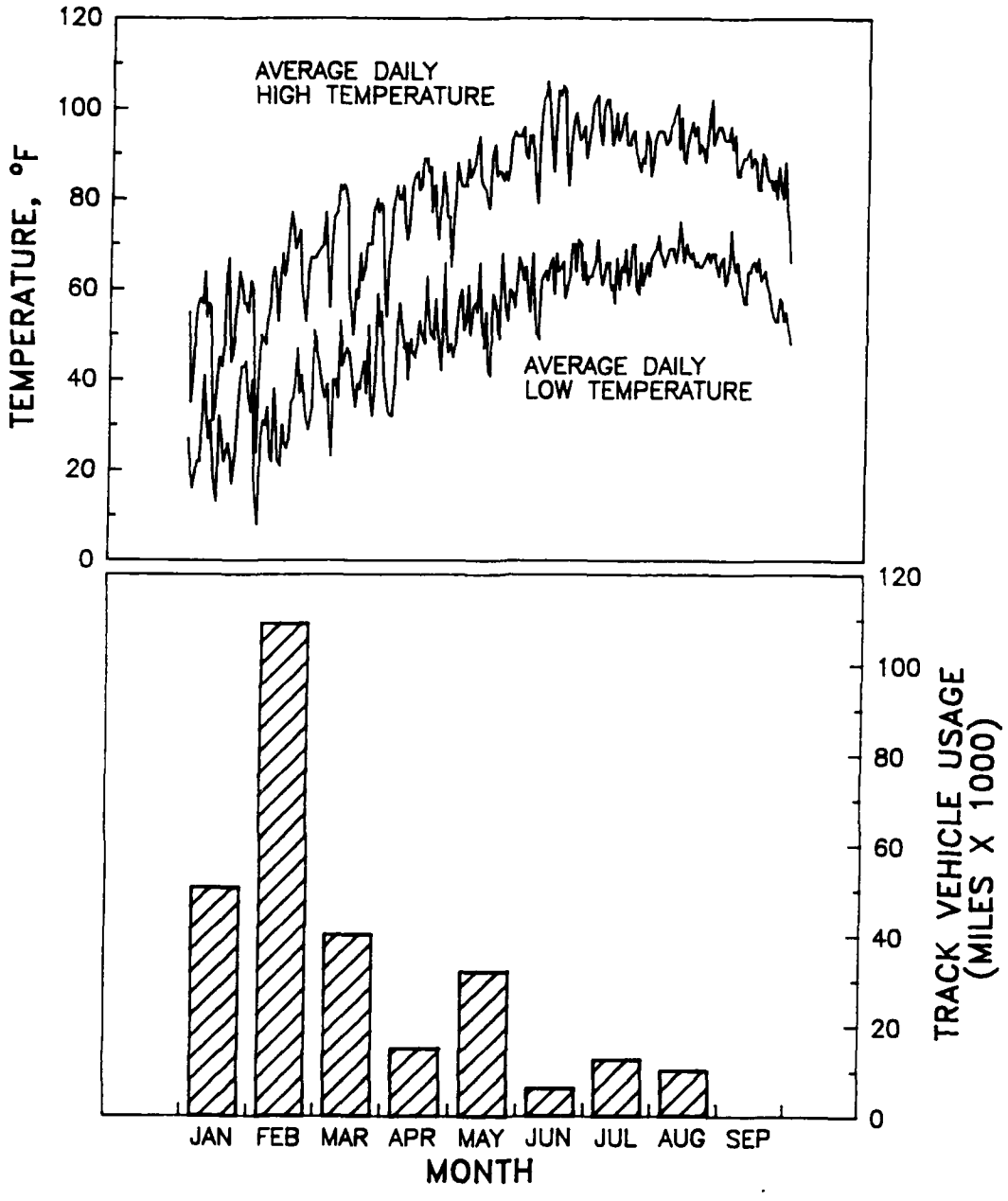
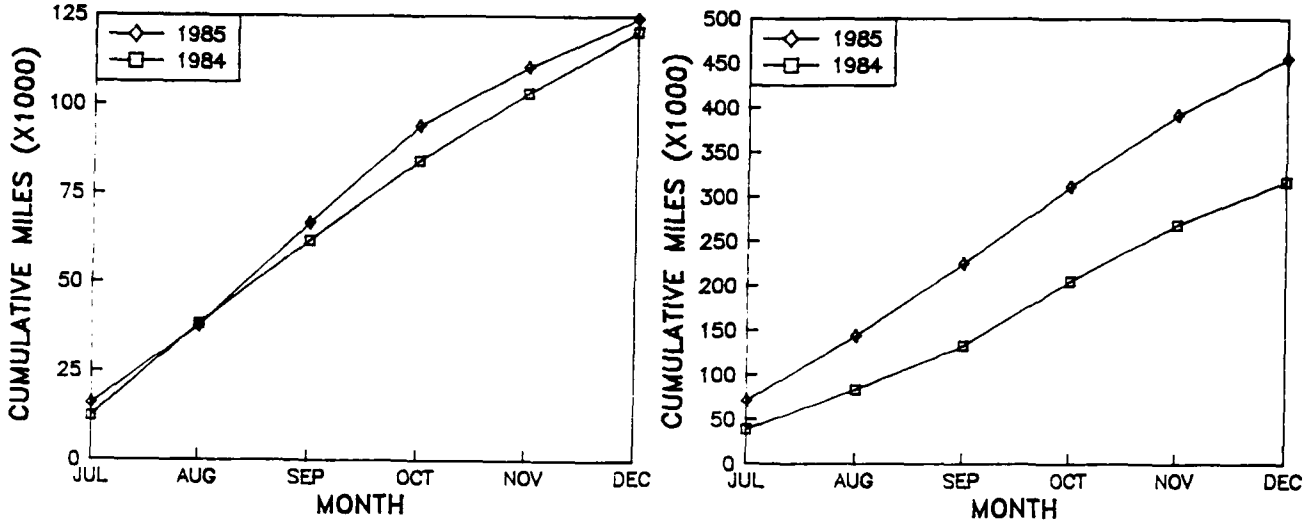


Fig. 7. Temperature and track vehicle usage correlation at Fort Bliss, TX

mined. However, the fuel and oil additions that were reported could be used in calculating the total fleet consumption figures. These data, which summarize all the data reported by the tests fleets, are reported as "All Equipment Contributing to any Given Element" in Appendix C. These same data, summarized for each month, are also reported as "Monthly Cumulative Data for Miles, Hours, Fuel and Oil." Note that the vehicles used in compiling this summary also includes the previously discussed vehicles with all operational data reported.



a. Track Vehicles

b. Wheeled Vehicles

Fig. 8. Monthly cumulative miles for wheel and tracked vehicles at Fort Knox, KY

Distribution frequencies were computed and plotted as histograms for miles and hours of operation for engine groups. The graphs display the general usage of tactical and combat vehicles in military service, i.e., relatively short trips with low mileage per hour of operation. The histograms are included in Appendix D.

B. Equipment Impacts

The impact of using grade 15W-40 lubricant on fielded equipment was evaluated by comparison of engine and transmission replacements for combat vehicles and comparison of Army Oil Analysis Program (AOAP) wear data for engine and transmissions representing a variety of tactical and combat vehicles. The comparisons were compiled using maintenance records and AOAP data for the 1985 validation test period and a similar duration period of equipment operation during 1984. In addition, problems occurring during the test and subjective evaluations by equipment operators and maintenance personnel were summarized.

1. Combat Vehicle Engine/Transmission Replacements

With two exceptions, engine and transmission replacements were tracked for all combat vehicles operated as part of the Fort Knox and Fort Bliss test fleets. The exceptions consisted of the M3 Cavalry Fighting Vehicle, which composed part of the Fort Knox fleet and the M113 series vehicles (i.e., M113, Armored Personnel Carrier; M106, Self-Propelled Motor; M220, TOW Guided Missile Carrier; M548, Cargo Carrier; and M577, Command Post) operated by the 3D ACR at Fort Bliss. The M3 Fort Knox vehicles were not included because they had just been introduced into the Fort Knox fleet at the initiation of the program and no baseline data were available for comparison. The M113 series Fort Bliss vehicles were not included because replacement records for the 3D ACR vehicles could not be segregated from those of other units supported by the Fort Bliss Directorate of Logistics.

A summary comparing engine and transmission replacements for the 1984 baseline period and the 1985 validation test are shown in TABLE 6.

TABLE 6. Engine and Transmission Replacement Summary

Component	Vehicle Application	Fort Knox 1984	Fort Knox 1985	Fort Bliss 1984	Fort Bliss 1985
Engine Replacements					
AVDS-1790 (All Models)	M60, AVLB, & M728	51	50	152	169
AVDS-1790-2R	M88	2	4	11	15
6V-53N	M113 Series	5	19	*	*
6V-53T	M551	10	9	**	**
8V-71T	M578 & M109	***	***	9	3
Transmission Replacements					
CD 850-6A	M60, AVLB, & M728	45	43	75	74
XT-1410-2A	M88	2	3	14	8
TX-100-1	M113 Series	2	5	*	*
G-250-1A	M551	11	3	**	**
G-411-2A	M578 & M109	***	***	5	6

* Data not available for determining engine and transmission replacements for M113 series vehicles at Fort Bliss.
** M551 vehicles were not part of the Fort Bliss test fleet.
*** M578 and M109 vehicles were not part of the Fort Knox test fleet.

In preparing the summary, all reported replacements were included with the exception of those at Fort Knox that had been directed by the AOAP laboratory. A change in Fort Knox's contractor-operated AOAP facility occurred at the beginning of FY85 (October 1984). Examination of the data showed that subsequent to October 1984 there had been a significant increase in the number of AOAP-directed oil changes and engine/transmission replacements. For example, during the baseline period, there was only one occurrence of an AOAP-directed engine/transmission replacement, while 14 such replacements were directed by the AOAP laboratory during the validation test period. Therefore, all AOAP-directed replacements were deleted from the Fort Knox data in order to maintain consistency in the comparison.

Evaluation of the replacement data was more straightforward for the Fort Knox fleet than for the Fort Bliss equipment. As shown by Fig. 8, combat (tracked) vehicle operation during the baseline and test periods at Fort Knox were very similar. In addition, the Fort Knox records provided insight as to the cause of component replacements. The same detailed information relating to cause of replacement was not available for the Fort Bliss baseline period; and AOAP records had to be used to evaluate similarities in equipment operation during the two periods.

Considering the available data, it appeared that the replacement rate for the AVDS-1790 engines and all transmission systems were not significantly different between the baseline period when single-grade lubricants were used and the validation test period when the grade 15W-40 oil was employed. In the case of the two-cycle engines, the Fort Knox data indicated an increased replacement rate for the naturally aspirated 6V-53N engine during the test period and an equivalent replacement rate between periods for the higher output turbocharged (6V-53T) version of the engine. As previously noted, it was not possible to obtain data for comparison of the 6V-53N powered equipment operated at Fort Bliss. However, the Fort Bliss data did indicate less replacements for the 7V-81T engines during the validation test period.

2. Engine/Transmission Wear Evaluations

The majority of the equipment at both test sites were enrolled in AOAP where the equipment was routinely monitored for accumulated wear debris in the engine and transmission lubricant. Since this monitoring provided a ready data base of oil analyses, the AOAP data were selected for evaluating the relative wear rates occurring in engine and transmission components. Throughout the test, AOAP records were extracted from the historical computer files at Kelly Air Force Base, San Antonio, TX. Also, the AOAP records were obtained for the 1984 baseline period. Therefore, with the two sets of data, it would be possible to statistically compare relative wear rates that were observed during the test and those that had occurred when single-grade lubricants were used at the test sites.

Prior to making any evaluations, it was necessary to undertake an extensive cleanup effort. This effort was required because of missing and/or obviously erroneous values contained in the data base. A description of the methodology used in this effort is given in Appendix E.

After completing the cleanup effort, the data were statistically analyzed using iron, copper, and lead values as indicators of relative engine wear and iron, copper, and silver values for transmission wear. In addition, silicon values were used as an indicator of dirt contamination or ingestion. The statistical analysis consisted of determination of the mean concentration and deviation of the metal values for each vehicle class followed by conduct of a T-test to compare the observed values from the 1984 baseline and 1985 validation test periods. The calculated means and standard deviations of the wear metals, along with the outer elements monitored by AOAP, are presented in Appendix F. The results of the T-tests comparing the two data sets are given in Appendix G. In addition, the comparisons of the data sets are summarized in TABLES 7 and 8, respectively, for the engine and transmission evaluations.

On initial inspection, the comparison of engine data consistently indicates reduced wear rates with the grade 15W-40 lubricants. However, the Fort Knox data are skewed by increased oil usage resulting from the significant increase in AOAP-directed oil changes. This increased change frequency undoubtedly accounts to

TABLE 7. Summary of T-Test Analyses Results Comparing the Equality of the Means for Wear Metals of Engines Between 1984 and 1985

Engine	Vehicle Application	Wear Metal		
		Iron	Copper	Lead
Equipment Operated at Fort Knox, KY				
6V-53N	M106, M113, & M577	S(85)*	S(85)	NS
6V-53T	M551	NS	NS	S(85)
AVDS-1790 (All Models)	M60 & M88	S(85)	S(85)	S(85)
VTA-903T	M3	S(85)	S(85)	S(85)
LD-465-1	M35 & M49	NS	NS	S(85)
LDS-465-1	M52 & M54	S(85)	S(85)	S(85)
NHC-250	M813 & M816	NS	NS	NS
Equipment Operated at Fort Bliss, TX				
6V-53N	M106, M113, M548, M220, & M577	S(85)	S(85)	S(85)
8V-71T	M109 & M578	NS	NS	NS
AVDS-1790 (All Models)	M60, M88, M728, & AVLB	NS	S(85)	S(85)
DD-353	M561	NS	NS	NS
LDS-427-1	M185	NS	NS	NS
LS-465-1	M35, M36, M49, & M275	S(85)	S(85)	S(85)
LDS-465-1	M52, M54, & M543	S(85)	S(85)	S(85)
NHC-250	M813, M816, M817, & M818	S(85)	S(85)	S(85)
NTC-400	M916	NS	NS	NS
8V-92T	M911	NS	NS	NS

* S(85) - Indicates a significant difference between the 1984 and 1985 mean wear metal values at a 95 percent level of confidence. The bracketed number indicates the year in which significantly lower wear levels were observed.

NS - Indicates no significant difference between the 1984 and 1985 mean wear metal values at a 95 percent level of confidence.

TABLE 8. Summary of T-Test Analyses Results Comparing the Equality of the Means for Wear Metals of Transmissions Between 1984 and 1985

Transmission	Vehicle Application	Wear Metal		
		Iron	Copper	Silver
Equipment Operated at Fort Knox, KY				
XT-100-1	M106, M113, & M577	NS*	S(85)	NS
G-250-1A	M551	S(85)	S(85)	--
CD 850-6A	M60	S(85)	S(85)	S(85)
XT-1410-2A	M88	NS	S(85)	NS
Equipment Operated at Fort Bliss, TX				
XT-100-1	M106, M113, M548, M220, & M577	S(85)	S(85)	NS
G-411-2A	M109 & M578	S(85)	S(85)	S(85)
CD 850-6A	M60, AVLB, & M728	S(85)	S(85)	S(85)
XT-1410-2A	M88	S(85)	S(85)	S(85)

* NS - Indicates no significant difference between the 1984 and 1985 mean wear metal values at a 95 percent level of confidence.

S(85) - Indicates a significant difference between the 1984 and 1985 mean wear metal values at a 95 percent level of confidence. The bracketed number indicates the year in which significantly lower wear levels were observed.

some extent for the reduced level of wear metals observed in the used lubricant from the Fort Knox vehicles during the test period. However, the same trend in lower levels of wear debris was shown to exist for Fort Bliss where there was no known factors influencing the data. As such, it was considered that the 15W-40 oil at least had no adverse effect on engine wear performance.

Also, the used oil analyses data for transmissions operated at both test locations appear to show favorable decreases in wear debris for the period during which the 15W-40 oil was employed. However, further investigations (12) found that there is an extremely low rate of AOAP-directed oil changes for transmissions. This low rate would mean that the initial change to the 15W-40 oil at the beginning of the

test program was the first time a fluid change had occurred in these components within a year or more period. As such, the initial change to the 15W-40 lubricant may account for a significant portion of the observed reduction in wear metal, thus negating an accurate evaluation of the effect of the 15W-40 oil on transmission wear performance.

3. Summary of Problems and Subjective Comments

During the test, both test sites reported several occurrences of overheating (i.e., engine operating hotter) of M60 and M88 vehicles when using the 15W-40 oil. Investigation of these reports failed to substantiate the existence of a problem. However, the investigation did uncover the fact that similar operation had been observed when these vehicles used single-graded lubricants.

A few hydraulic and seal concerns were addressed early in the program. Operators of the M88 recovery vehicle noted that the hydraulically operated boom raised as quickly with the 15W-40 oils as it had with the previously used grade 10W lubricant, but lowering the boom was slower with the 15W-40. The slower operation was determined to be due to the difference in viscosity of the two fluids and did not cause any operational problems. Although the operators were given the option to return to the grade 10W fluid, doing so was not felt necessary, and the hydraulic systems remained on the 15W-40 oil throughout the test.

Problems were immediately encountered with the power steering system of M52, M54, M55, and M543 5-ton trucks located at Fort Bliss. When converted to the 15W-40 oil, some of the steering units would lock, making it impossible for the driver to turn the vehicle, while other units operated flawlessly. After discussions with the manufacturer of the steering unit (13), it was determined that the problem likely was the result of inadequate air bleeding during the conversion to the test lubricant. The manufacturer stated that, although not tested, the power steering unit should operate properly with the 15W-40 oil. In addition to the steering unit problem, complaints of engine rear main seal leakage with M35 and M50 trucks were investigated at Fort Bliss. The engine rear main seals of leaking vehicles were replaced, and the problem did not reoccur. The leakage problem appeared to just be one of identification of worn seals that already required replacement.

Throughout the test, operating and maintenance personnel were queried concerning performance of the 15W-40 lubricants. In response, personnel indicated satisfaction with the lubricant and appreciation for the convenience of having only one oil to requisition, store, and transport to the field.

V. CONCLUSIONS

As a result of this field validation program, the following conclusions are drawn:

- Lower ambient temperature viscosity of 15W-40 compared to 30 and 50 grades currently in use may result in increased leakage from worn seals, resulting in increased maintenance following conversion until seals are replaced.

- At Fort Knox, there was an increase in the rate of replacement of the Detroit Diesel naturally aspirated 53 series engines in 1985 compared to 1984. It is not clear from the available data that these increased engine removals were the result of lubrication problems; however, this increase supports the belief that this engine family is the most lubricant sensitive in the Army diesel fleet.

- AOAP data indicated that the engine wear performance of the 15W-40 oil was at least equal to and potentially improved over the single-grade lubricants previously employed.

- There does not appear to be a difference in engine replacements in any other monitored equipment between the two test years.

- There did not appear to be a difference in replacement rates for transmissions monitored during the test.

- The benefits of multiviscosity grade engine oils are apparent to the users even in the relatively hot climates of this impact test. Personnel at both sites were generally satisfied with the test oils and with having to deal with only one viscosity grade.

- Several warranty problems arose because of the fielding of new mobility systems by the U.S. Army. Manufacturers had not authorized the use of a technologically advanced lubricating oil in these systems.

VI. RECOMMENDATIONS

The following recommendations are made based on the conclusions reached at the end of the field validation program:

- Even though all MIL-L-2104D 15W-40 grade oils are screened using a Detroit Diesel 6V-53T engine test, the 53 series engines may have been adversely impacted by the use of the 15W-40 lubricant. This possibility needs to be investigated further so that changes in the passing criteria of the 6V-53T test can be revised if necessary.

- To preclude future warranty problems that arose during this demonstration test, close liaison should be established among Belvoir RDE Center and new mobility equipment combat developers, project managers, and manufacturers so that the new hardware introduced into the U.S. Army system will be lubricated and protected by lubricants embodying the latest technological concepts and materials.

VII. LIST OF REFERENCES

1. U.S. Army Specification No. 2-104, Oil, Engine, 3 September 1941.

2. Montemayor, A.F.; Owens, E.C.; Frame, E.A.; Lestz, S.J.; and Bowen, T.C., "Laboratory Evaluation of Army Multiviscosity Grade Tactical Engine Oils," SAE Paper No. 831719, presented at Society of Automotive Engineer's Fuels and Lubricants Meeting, San Francisco, CA, 1 November 1983.

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6. Military Specification MIL-L-2104D, Lubricating Oil, Internal Combustion Engines, Tactical Service, 1 April 1983.

7. Moon, R.B. and Montemayor, A.F., "Laboratory Evaluation of Multiviscosity-Grade Engine Oils in U.S. Army Diesel Engines," Interim Report AFLRL No. 112, AD A108890, prepared by U.S. Army Fuels and Lubricants Research Laboratory, San Antonio, TX, May 1981.

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9. Letter with subject: Limited Field Validation Program for Multigraded Tactical Engine Oils, prepared by U.S. Army Belvoir Research and Development Center to Fort Bliss Deputy for Plans and Training, ATZC-DPT (Col. R.O. Hays), 14 June 1984.

10. Military Specification MIL-L-2104C, Lubricating Oil, Internal Combustion Engine, Tactical Service, 20 November 1970.

11. Letter with subject: Field Validation Test of Grade 15W-40 Engine Oil, prepared by U.S. Army Belvoir Research and Development Center to U.S. Army Armor Center, ATZK-DPT (Major Willis), 29 January 1985.

12. Haley, G., U.S. Army Materiel Readiness Support Agency (MRSA), Lexington, KY, personal communication with E.C. Owens, Belvoir Fuels and Lubricants Research Facility (SwRI), 30 April 1987.

13. La Bounty, D., Ross Manufacturing Company, telephone conversation with W.E. Butler, Belvoir Fuels and Lubricants Research Facility (SwRI), Subject: Effect of 15W-40 Oil in Steering Gear Boxes for M54 5-Ton Trucks at Fort Bliss, TX, 12 November 1986.

APPENDIX A

Field Validation Program for MIL-L-2104D Lubricants

FIELD VALIDATION PROGRAM FOR MIL-L-2104D LUBRICANTS
FORT KNOX, KY

Purpose

To demonstrate acceptable field performance of MIL-L-2104D OE/HDO 15W-40 lubricants in all vehicles and engineer equipment in which single-viscosity MIL-L-2104C lubricants are now authorized.

Objectives

1. To reduce the number of lubricant viscosity grades required for lubrication of U.S. Army tactical/combat equipment.
2. To increase equipment readiness, improve lubricant utilization, and reduce maintenance and logistic support requirements.
3. To determine the quality of delivered multiviscosity oil over the period of the program by monitoring:

    a. AOAP oil analyses
    b. Vehicle and equipment performance
    c. Laboratory tests
    d. User comments.

Scope

1. Support Agencies
    a. U.S. Army Belvoir Research and Development Center
    b. U.S. Army Fuels and Lubricants Research Laboratory (AFLRL)
    c. U.S. Army Material Readiness Support Activity (MRSA)
2. Participating organizations will be requested through U.S. Army Forces Command (FORSCOM) and/or the U.S. Army Training and Doctrine Command (TRADOC) in accordance with applicable regulations and procedures.

Publications

1. Army Energy R & D Plan, 1983.
2. Tables of Organization and Equipment (TOE) for organizations and units involved.
3. Lubrication Orders (LO's) for respective vehicular and engineer equipment.
3. Current procedures for sampling oils and transporting the samples to the appropriate Army Oil Analysis Program (AOAP) laboratory.
4. Applicable Technical Manuals for authorized vehicles and engineer equipment.
5. TB 43-0210 "Nonaeronautical Equipment Army Oil Analysis Program (AOAP)."
6. DA Pamphlet 650-5 "Army Oil Analysis Program Guide for Leaders."
7. Federal Specification MIL-L-2104D.

Operating Parameters

1. All vehicles and equipment authorized to participating organizations will be operated with MIL-L-2104D lubricants exclusively.
2. The program will begin on a date agreed to in liaison/coordinating meetings with participating units.
3. Maintenance and usage data will be gathered as will analyses data from oil samples.
4. Nothing will be required of participating organizations. They will perform normal mission/training activities.

Program Implementation

1. Units designated by FORSCOM or TRADOC as participating organizations will be notified and their approval to participate in the program solicited.
2. AFLRL will procure the necessary number of drums of MIL-L-2104D. Normally, two MIL-L-2104D lubricants of different manufacture will be evaluated simultaneously.

3. A sufficient number of drums of MIL-L-2104D lubricant will be shipped to each of the participating organizations. The remaining drums will be stored at AFLRL.

4. Organization supply personnel (S-4) will order resupply oils by notifying the AFLRL program monitor at least 15 days prior to need for resupply.

5. Participating units will draw oil samples and forward them as prescribed in TB 43-0210.

6. Coordination/Points of Contact (POC).

   a. Fort Knox, KY - Major Richard S. Smith, Executive Officer, 2/6th Cavalry Squadron, Ft. Knox, KY, Commercial (502) 624-4222/5723

   b. Field liaison.

      (1) Belvoir R & D Center

          Mr. T.C. Bowen, AUTOVON 354-3476

      (2) AFLRL

          Mr. Walt Butler, Commercial (512) 684-5111, Ext. 3128.

   c. Program coordination

      (1) Belvoir R & D Center

          (a) Mr. Mario LePera, AUTOVON 354-3435;
              Commercial (703) 664-3435

          (b) Mr. Forrest Schaekel, AUTOVON 354-3576;
              Commercial (703) 664-3576

      (2) FORSCOM or TRADOC: To Be Determined

      (3) MRSA

          Mr. Cy Brown, AUTOVON, 745-3554;
          Commercial (606) 293-3554

7. Reports

   a. Data gathered during the program will be prepared in quarterly report format by AFLRL, reviewed and approved by Belvoir R&D Center, which will disseminate the reports to all participating activities.

   b. No formal reports will be required from participating organizations.

   c. Reports concerning specific problems that may arise during the program may be presented at any time. Such problems may include, but not be limited to, the following:

(1) Inadequate lubricant performance.

(2) Excessive oil usage requirements.

(3) Unexpected component failures for which no explanation can be assigned and which might be oil related.

8. Potential impacts to utilization of MIL-L-2104D multiviscosity lubricants will be determined by obtaining data in the following areas without introducing any disruptions to unit operations or tasking unit personnel to do additional duties.

a. Changes in oil quality based upon:

(1) Engine performance

(a) Objective determinations

1. Total miles driven.

2. Oil consumed, gallons.

3. Hours of operation, where applicable.

4. Fuel consumption records.

(b) Subjective determinations

1. User comments

a. Engine starts easier, harder, or no change.

b. Engine develops more power, less power, no change.

c. Other.

(2) Engine maintenance

(a) Engine changes.

(b) Organization usage data for the listed items.

1. Lead-storage batteries

2. Starters

3. Generators

9. Data Acquisition by USAFLRL

a. Oil analyses data for the programs will be obtained via a computer print-out, which will be provided by the AOAP Lab at the test site or a magnetic computer tape provided to AFLRL by MRSA.

b. Component usage data and vehicle and equipment operations data will be obtained at organization level by requesting that the maintenance and operations logs kept for each vehicle usually discarded after 30 days be retained for pickup by the AFLRL test

monitor at intervals to be agreed upon during initial coordinating/liaison meetings.

Responsibilities

1. Belvoir R & D Center
   a. Overall mission responsibility for the planning, coordinating, funding, and implementing of the field validation program.
   b. Keep POC's in support agencies and participating organizations informed as to any discernible trends and any problems that may be developing.
   c. Oversight of monitor activities and data acquisition.
2. AFLRL
   a. Establishing liaison through Belvoir R & D Center with the POC at designated program sites.
   b. Obtaining data relative to oil-related component usage and operating experience.
   c. Obtaining oil analyses data from each AOAP Lab or from a magnetic computer tape provided to AFLRL by MRSA, analyzing the data, and disseminating the results.
   d. Providing technical support as required to POC's in participating organizations.
   e. Publishing results of observations and sample evaluations on a quarterly basis.
3. MRSA

   Providing a magnetic tape containing AOAP data to AFLRL monthly.

FIELD VALIDATION PROGRAM FOR MIL-L-2104D LUBRICANTS
FORT BLISS, TX

Purpose

To demonstrate acceptable field performance of MIL-L-2104D OE/HDO 15W-40 lubricants in all vehicles and engineer equipment in which single-viscosity MIL-L-2104C lubricants are now authorized.

Objectives

1. To reduce the number of lubricant viscosity grades required for lubrication of U.S. Army tactical/combat equipment.
2. To increase equipment readiness, improve lubricant utilization, and reduce maintenance and logistic support requirements.
3. To determine the quality of delivered multiviscosity oil over the period of the program by monitoring:

    a. AOAP oil analyses
    b. Vehicle and equipment performance
    c. Laboratory tests
    d. User comments.

Scope

1. Support Agencies
    a. U.S. Army Belvoir Research and Development Center
    b. U.S. Army Fuels and Lubricants Research Laboratory (AFLRL)
    c. U.S. Army Material Readiness Support Activity (MRSA)
2. Participating organizations will be requested through U.S. Army Forces Command (FORSCOM) and/or the U.S. Army Training and Doctrine Command (TRADOC) in accordance with applicable regulations and procedures.

Publications

1. Army Energy R & D Plan, 1983.
2. Tables of Organization and Equipment (TOE) for organizations and units involved.
3. Lubrication Orders (LO's) for respective vehicular and engineer equipment.
3. Current procedures for sampling oils and transporting the samples to the appropriate Army Oil Analysis Program (AOAP) laboratory.
4. Applicable Technical Manuals for authorized vehicles and engineer equipment.
5. TB 43-0210 "Nonaeronautical Equipment Army Oil Analysis Program (AOAP)."
6. DA Pamphlet 650-5 "Army Oil Analysis Program Guide for Leaders."
7. Federal Specification MIL-L-2104D.

Operating Parameters

1. All vehicles and equipment authorized to participating organizations will be operated with MIL-L-2104D lubricants exclusively.
2. The program will begin on a date agreed to in liaison/coordinating meetings with participating units.
3. Maintenance and usage data will be gathered as will analyses data from oil samples.
4. Nothing will be required of participating organizations. They will perform normal mission/training activities.

Program Implementation

1. Units designated by FORSCOM or TRADOC as participating organizations will be notified and their approval to participate in the program solicited.
2. AFLRL will procure the necessary number of drums of MIL-L-2104D. Normally, two MIL-L-2104D lubricants of different manufacture will be evaluated simultaneously.

3. A sufficient number of drums of MIL-L-2104D lubricant will be shipped to each of the participating organizations. The remaining drums will be stored at AFLRL.

4. Organization supply personnel (S-4) will order resupply oils by notifying the AFLRL program monitor at least 15 days prior to need for resupply.

5. Participating units will draw oil samples and forward them as prescribed in TB 43-0210.

6. Coordination/Points of Contact (POC).

   a. Fort Bliss, TX - Colonel Robert O. Hays, Deputy for Plans and Training, Fort Bliss, TX, Commercial (915) 568-3393.

   b. Field liaison.

      (1) Belvoir R & D Center

          Mr. T.C. Bowen, AUTOVON 354-3476

      (2) AFLRL

          Mr. Walt Butler, Commercial (512) 684-5111, Ext. 3128.

   c. Program coordination

      (1) Belvoir R & D Center

          (a) Mr. Mario LePera, AUTOVON 354-3435;
              Commercial (703) 664-3435

          (b) Mr. Forrest Schaekel, AUTOVON 354-3576;
              Commercial (703) 664-3576

      (2) FORSCOM or TRADOC: To Be Determined

      (3) MRSA

          Mr. Cy Brown, AUTOVON, 745-3554;
          Commercial (606) 293-3554

7. Reports

   a. Data gathered during the program will be prepared in quarterly report format by AFLRL, reviewed and approved by Belvoir R&D Center, which will disseminate the reports to all participating activities.

   b. No formal reports will be required from participating organizations.

   c. Reports concerning specific problems that may arise during the program may be presented at any time. Such problems may include, but not be limited to, the following:

(1) Inadequate lubricant performance.

(2) Excessive oil usage requirements.

(3) Unexpected component failures for which no explanation can be assigned and which might be oil related.

8. Potential impacts to utilization of MIL-L-2104D multiviscosity lubricants will be determined by obtaining data in the following areas without introducing any disruptions to unit operations or tasking unit personnel to do additional duties.

a. Changes in oil quality based upon:

(1) Engine performance

(a) Objective determinations

1. Total miles driven.

2. Oil consumed, gallons.

3. Hours of operation, where applicable.

4. Fuel consumption records.

(b) Subjective determinations

1. User comments

a. Engine starts easier, harder, or no change.

b. Engine develops more power, less power, no change.

c. Other.

(2) Engine maintenance

(a) Engine changes.

(b) Organization usage data for the listed items.

1. Lead-storage batteries

2. Starters

3. Generators

9. Data Acquisition by USAFLRL

a. Oil analyses data for the programs will be obtained via a computer print-out, which will be provided by the AOAP Lab at the test site or a magnetic computer tape provided to AFLRL by MRSA.

b. Component usage data and vehicle and equipment operations data will be obtained at organization level by requesting that the maintenance and operations logs kept for each vehicle usually discarded after 30 days be retained for pickup by the AFLRL test

monitor at intervals to be agreed upon during initial coordinating/liaison meetings.

Responsibilities

1. Belvoir R & D Center
   a. Overall mission responsibility for the planning, coordinating, funding, and implementing of the field validation program.
   b. Keep POC's in support agencies and participating organizations informed as to any discernible trends and any problems that may be developing.
   c. Oversight of monitor activities and data acquisition.
2. AFLRL
   a. Establishing liaison through Belvoir R & D Center with the POC at designated program sites.
   b. Obtaining data relative to oil-related component usage and operating experience.
   c. Obtaining oil analyses data from each AOAP Lab or from a magnetic computer tape provided to AFLRL by MRSA, analyzing the data, and disseminating the results.
   d. Providing technical support as required to POC's in participating organizations.
   e. Publishing results of observations and sample evaluations on a quarterly basis.
3. MRSA

   Providing a magnetic tape containing AOAP data to AFLRL monthly.

APPENDIX B

Field Validation Program Vehicles and Equipment

NOMENCLATURE COMBAT VEHICLES	Total in Test	Fuel	Engine	XMSN	Final Drive	Transfer Case	Differential	Hydraulic Mechanism	Turret Drive
Tank Combat 90mm M60A1	162	Diesel	Continental AVDS 1790-2A	DDA CD-850-6A	Yes	NA	NA	Yes	NA
Carrier Personnel Armored M113A1	139	Diesel	Continental DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	NA
Carrier Command Post M577A1	27	Diesel	DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	NA
Carrier Mortar SP M106A2	27	Diesel	DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	NA
Carrier Guided Missile (Tow) M220A1	57	Diesel	DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	NA
Carrier Cargo Ft. M548A1	20	Diesel	DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	NA
Armored Vehicle Launch Bridge (AVLB)	6	Diesel	Continental AVDS 1790-2A	DDA CD-850-6A	Yes	NA	NA	Yes	NA
Combat Engineer Vehicle M728	3	Diesel	Continental AVDS 1790-2A	DDA CD-850-6A	NA →				
Recovery Vehicle Light M578*	6	Diesel	DD 8V71T	G-411-2A	NA →				
Recovery Vehicle Medium M88A1	17	Diesel	Continental AVDS 1790-2DR	XT-1410-4	NA →			Yes	Yes
Howitzer Medium SP M109A2	12	Diesel	DD 8V71T	G-411-2A	NA →				
TACTICAL VEHICLES									
Truck Cargo Tactical 5/4 Ton M1008	22	Diesel	GM 6.2L	NA →					
Truck Utility Tactical 3/4 Ton M1009	60	Diesel	GM 6.2L	NA →					
Truck Cargo Tactical 5/4 Ton M1028	5	Diesel	GM 6.2L	NA →					
Truck Van Shop 2 1/2 Ton M109A3	40	Diesel	Continental LD465-1	NA →					
Truck Tractor 10 Ton 123A1	2	Diesel	Cummins V8-300	NA →					
Truck Utility 1/4 Ton M151A2	115	MOGAS	Ford L-141	NA →					
Truck Tractor 2 1/2 Ton M275A2	3	Diesel	Continental LD 465-1	NA →					
Truck Cargo 2 1/2 Ton M35A2	146	Diesel	Continental LD 465-1	NA →					
Truck Cargo 2 1/2 Ton XLWB M36A2	6	Diesel	Continental LD 465-1	NA →					
Truck Tank Fuel 2 1/2 Ton M49A2C	3	Diesel	Continental LD 465-1	NA →					
Truck Tank Water 2 1/2 Ton M50A2	1	Diesel	Continental LD 465-1	NA →					
Truck Tractor 5 Ton M52A2	18	Diesel	Continental LD 465-1	NA →					
Truck Cargo 5 Ton M54A2	61	Diesel	Continental LDS-465-1	NA →					
Truck Wrecker 5 Ton M543A2	10	Diesel	Continental LD 465-1	NA →					
Truck Cargo 5 Ton M55A2	2	Diesel	Continental LDS 465-1	NA →				Yes	NA
Truck Cargo 1 1/4 Ton M561	30	Diesel	DD 3-53	NA →					
Truck Ambulance Tactical 1 1/4 Ton M792	4	Diesel	DD 3-53	NA →					

*Did not use 15W-40 in hydraulic system 2d and 3d Squadron

NOMENCLATURE	Total in Test	Fuel	Engine	XMSN	Final Drive	Transfer Case	Differential	Hydraulic Mechanism	Turret Drive
TACTICAL VEHICLES									
Truck Cargo 5 Ton M813	23	Diesel	Cummins NHC-250						
Truck Cargo 5 Ton XLWB M814	1	Diesel	Cummins NHC-250						
Truck Wrecker 5 Ton M816	3	Diesel	Cummins NHC-250						
Truck Dump 5 Ton M817	6	Diesel	Cummins NHC-250						
Truck Tractor 5 Ton M818	14	Diesel	Cummins NHC-250						
Truck Cargo Tactical 1 1/4 Ton M880	10	MOGAS	Chrysler 318-V8						
Truck Cargo Tactical 1 1/4 Ton M883	1	MOGAS	Chrysler 318-V8						
Truck Cargo Tactical 1 1/4 Ton M884	5	MOGAS	Chrysler 318-V8						
Truck Cargo Tactical 1 1/4 Ton M885	4	MOGAS	Chrysler 318-V8						
Truck Ambulance Tactical 1 1/4 Ton M886	5	MOGAS	Chrysler 318-V8						
Truck Contact Maintenance 1 1/4 Ton M887	5	MOGAS	Chrysler 318-V8						
Truck Cargo Tactical 1 1/4 Ton M890	3	MOGAS	Chrysler 318-V8						
Truck Tractor HET 22 1/2 TON M911	2	Diesel	DD 8V-92TA						
Truck Dump 20 Ton M917	1	Diesel	Cummins NTA-400						
Truck Wrecker 5 Ton M936		Diesel	Cummins NHC-250						
Truck, Cargo, 10 Ton M977	28	Diesel	DD 8V92TA						
Truck, Tanker, 10 Ton M978	14	Diesel	DD 8V92TA						
MATERIAL HANDLING EQUIPMENT									
Loader Scoop 645M	3	Diesel	Allis-Chalmers 3500						
Tractor FT D7F	2	Diesel	Caterpillar Tractor D 333CT						
Grader Road M150QM	1	Diesel	DD 5063-5099						
Tractor Wheeled Warehouse G40C	3	MOGAS	Chrysler 931-1631-1						
Tractor Backhoe JD410	1	Diesel	John Deere JD4-2-19T-03						
Truck Forklift 6,000 lbs. MLT-6CH	2	Diesel	DD4-53N						
Truck Forklift 10,000 lbs. M10-A	7	Diesel	International DT-466B						
Truck Forklift 4,000 lbs. M4K	3	Diesel	Case G207D						
STATIONARY EQUIPMENT, MISC.									
Compressor Air 8CFM		Diesel	Continental MTRS JD 403						
Pump 100 GPM P100	5	MOGAS	MIL STD 2A016-1,2,3						
Pump 125 GPM P125	2	MOGAS	MIL STD 2A016-1,2,3						
Generator Set 1.5 KW	18	MOGAS	MIL STD 2A016-1,2,3						
Generator Set 3 KW	8	MOGAS	MIL STD 4A032-1,2						
Generator Set 4.2 KW									
Generator Set 5 KW	9	Diesel	ONAN DIV DJE-99/9485						
Generator Set 10 KW	11	MOGAS	MIL STD 4A084-2,3						
Generator Set 15 KW	1	Diesel	Hercules Engine D198-ERX51						
Generator Set 30 KW	4	Diesel	Hercules Engine D298-ERX37						
Generator Set 60 KW	4	Diesel	Allis Chambers 3500						
Heater Duct Type 250,000 BTU	2	MOGAS	MIL STD 1 A08, 1,2,3						
Generator Set APU JHGV75	2	MOGAS	Wisconsin Motor MVH4D						

NOT APPLICABLE

Vehicles and Equipment, 2/6th Cavalry

NOMENCLATURE COMBAT VEHICLES	Total in Test	Fuel	Engine	XMSN	Final Drive	Transfer Case	Differential	Hydraulic Mechanism	Turret Drive
Tank, Combat, 105mm, M60A1	12	Diesel	Continental AVDS 1790-2A	DDA CD-850-6A	Yes	NA	NA	Yes	NA
Tank, Combat, 105mm, M60A3	53	Diesel	Continental AVDS 1790-2C	DDA CD-850-6A	Yes	NA	NA	Yes	NA
STE-MI-M3	3								
Cavalry Fighting Vehicle, M3	26	Diesel	Cummins VTA-903T	GE HMPT-500					
Carrier Personnel Armored, M113A1	20	Diesel	DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	NA
Carrier Personnel Armored, M113A2	7	Diesel	DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	NA
Carrier 107 mm Mortar SP, M106A2	6	Diesel	DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	NA
Armored Recon ABN Assault Vehicle, M551	22	Diesel	DD 6V-53T	XTG-250-A1					
Carrier Command Post, M577A1	4	Diesel	DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	
Carrier Command Post, M577A2	3	Diesel	DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	NA
Recovery Vehicle Medium M88A1	15	Diesel	Continental AVDS 1790-2DR	XT-1410-4	NA	NA	NA	Yes	Yes
TACTICAL VEHICLES									
Truck Utility 1/4 Ton M151A2	71	MOGAS	Ford L-141	NA**					
Truck Cargo Tactical 1 1/4 Ton M880	2	MOGAS	Chrysler 318-V8	NA					
Truck Ambulance Tactical 1 1/4 Ton M886	1	MOGAS	Chrysler 318-V8	NA					
Truck Ambulance 1 1/4 Ton M792	8	Diesel	DD 3-53	NA					
Truck Cargo 2 1/2 Ton M35A2	25	Diesel	Continental LD465-1	NA					
Truck Tank FS 2 1/2 Ton w/w M49A2C	4	Diesel	Continental LD465-1	NA					
Truck Tractor 5 Ton w/w M52A2	1	Diesel	Continental LD465-1	NA					
Truck Tractor 5 Ton w/w M932	2	Diesel	Cummins NHC-250	NA					
Truck Cargo 5 Ton w/w M54A2	6	Diesel	Continental LDS465-1	NA					
Truck Cargo Dropside 5 Ton w/w M813A1	3	Diesel	Cummins NHC-250	NA					
Truck Wrecker 5 Ton w/w M816	2	Diesel	Cummins NHC-250	NA				Yes	NA
Truck Cargo Tactical 5/4 Ton M1008	9	Diesel	GM 6.2	NA					
Truck Utility Tactical 3/4 Ton M1009	43	Diesel	GM 6.2	NA					
Truck Ambulance Tactical 3/4 Ton M1010	9	Diesel	GM 6.2	NA					
Truck LF DD MDL MLT 6CH (MHE202)	1	Diesel	DD4-53N	Allison 3331-1				Yes	
Truck LF MDL ART FT6 (MHE222)	1	Diesel	DD4-53N	Allison 3331-1				Yes	

Vehicles and Equipment, B Troop, 1/3D ACR

NOMENCLATURE	Total in Test	Fuel	Engine	XMSN	Final Drive	Transfer Case	Differential	Hydraulic Mechanism	Turret Drive
COMBAT VEHICLES									
Tank Combat 90mm M60A1	12	Diesel	Continental AVDS 1790-2A	DDA CD-850-6A	Yes	NA	NA	Yes	NA
Carrier, Personnel, Armored, M113 A2	8	Diesel	DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	NA
Carrier, Command Post, M577A1	1	Diesel	DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	NA
Carrier, Mortar, SP, M106A2	3	Diesel	DD 6V-53T	TX-100-1	Yes	Yes	Yes	NA	NA
Carrier, Guided Missile (TDW) M220A1	5	Diesel	DD 6V-53	TX-100-1	Yes	Yes	Yes	NA	NA
Recovery Vehicle, Medium, M88A1	1	Diesel	Continental AVDS1790-2DR	XT-1410-4	NA	NA	NA	Yes	Yes
TACTICAL VEHICLES									
Truck, Utility 1/4 Ton M151A2	4	MOGAS	Ford L-141	NA					
Truck, Cargo 2 1/2 Ton M35A2	4	Diesel	Continental LD 465-1	NA					

APPENDIX C

Operational Data

APPENDIX C
TABLE OF CONTENTS

Fort Knox, KY

Fort Bliss, TX

Cumulative Data by Month

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JULY-DECEMBER 1984
2/6 CAVALRY SQUADRON FT. KNOX, KY.
ALL EQUIPMENT CONTRIBUTING TO ANY GIVEN ELEMENT

MODEL	VEHICLE COUNT (MILES)	TOTAL MILES	MIN MILES	MAX MILES	AVG MILES	VEHICLE COUNT (HOURS)	TOTAL HOURS	MIN HOURS	MAX HOURS	AVG HOURS
M1008	4	5684	0	2273	1421.00	0	.	.	.	.
M1009	31	104010	0	7726	3355.16	0	.	.	.	.
M1010	9	10078	544	2359	1119.78	0	.	.	.	.
M106A2	6	1998	153	465	333.00	6	195	20	40	32.50
M113	27	21798	18	1431	807.33	27	3270	15	386	121.11
M151A2	61	119548	0	5945	1959.80	0	.	.	.	.
M3	23	25496	94	2438	1108.52	23	2640	23	287	114.78
M35A2	22	51172	163	5796	2326.00	21	2903	8	314	138.24
M49A2C	4	4111	657	1465	1027.75	4	262	40	83	65.50
M52A2	1	657	657	657	657.00	1	97	97	97	97.00
M54A2	6	4191	74	1422	698.50	6	247	8	87	41.17
M551	21	8139	0	933	387.57	0	.	.	.	.
M577	6	1911	27	803	318.50	6	338	7	160	56.33
M60	66	54204	140	1569	821.27	66	7703	14	213	116.71
M813A1	3	3717	922	1417	1239.00	3	287	89	100	95.67
M816	2	4373	7	4366	2186.50	2	279	1	278	139.50
M88A1	8	7114	50	1772	889.25	8	1850	108	425	231.25
M880	10	3932	46	1178	393.20	0	.	.	.	.
M886	1	895	895	895	895.00	0	.	.	.	.
M932	2	5166	2312	2854	2583.00	2	317	142	175	158.50

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JULY-DECEMBER 1984
2/6 CAVALRY SQUADRON FT. KNOX, KY.
ALL EQUIPMENT CONTRIBUTING TO ANY GIVEN ELEMENT

MODEL	VEHICLE COUNT (FUEL)	TOTAL FUEL(GAL)	MIN FUEL(GAL)	MAX FUEL(GAL)	AVG FUEL(GAL)
M1008	4	589	0	325	147.25
M1009	31	6462	0	484	208.45
M1010	9	928	50	222	103.11
M106A2	6	832	57	201	138.67
M113	27	17340	127	1065	642.22
M151A2	61	13434	0	1093	220.23
M3	23	11894	160	889	517.13
M35A2	22	8508	0	1303	386.73
M49A2C	4	645	90	298	161.25
M52A2	1	204	204	204	204.00
M54A2	6	941	77	249	156.83
M551	21	5750	0	1464	273.81
M577	6	1366	58	685	227.67
M60	66	84774	290	2113	1284.45
M813A1	3	629	108	279	209.67
M816	2	795	50	745	397.50
M88A1	8	12656	712	2725	1582.00
M880	10	756	18	168	75.60
M886	1	256	256	256	256.00
M932	2	975	448	527	487.50

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
ALL EQUIPMENT CONTRIBUTING TO ANY GIVEN ELEMENT

MODEL	VEHICLE COUNT (MILES)	TOTAL MILES	MIN MILES	MAX MILES	AVG MILES	VEHICLE COUNT (HOURS)	TOTAL HOURS	MIN HOURS	MAX HOURS	AVG HOURS
M1008	9	43296	1859	11595	4810.67	0	.	.	.	.
M1009	43	205750	619	10791	4784.88	0	.	.	.	.
M1010	9	22410	1698	3326	2490.00	0	.	.	.	.
M106A2	6	3835	453	769	639.17	6	652	76	142	108.67
M113	27	46206	132	3057	1711.33	27	6218	27	460	230.30
M151A2	71	357133	249	12580	5030.04	0	.	.	.	.
M3	26	25183	213	2051	968.58	26	6292	41	526	242.00
M35A2	25	123887	1931	10483	4955.48	25	9249	102	726	369.96
M49A2C	4	15179	2435	4848	3794.75	4	1103	135	449	275.75
M52A2	1	2789	2789	2789	2789.00	1	157	157	157	157.00
M54A2	6	13649	759	3351	2274.83	6	1278	164	316	213.00
M551	22	26206	6	3840	1191.18	0	.	.	.	.
M577	3	3562	245	1775	1187.33	3	774	214	284	258.00
M60	66	118326	615	2799	1792.82	66	16209	80	504	245.59
M813A1	3	11515	2937	5312	3838.33	3	553	160	221	184.33
M816	2	4715	1993	2722	2357.50	2	425	182	243	212.50
M88A1	15	14087	129	2664	939.13	15	2232	45	363	148.80
M880	2	3300	1076	2224	1650.00	0	.	.	.	.
M886	1	785	785	785	785.00	0	.	.	.	.
M923	1	3399	3399	3399	3399.00	1	155	155	155	155.00
M932	2	14034	6498	7540	7017.00	2	762	357	405	381.00
M998	2	1385	539	846	692.50	0	.	.	.	.

MODEL	VEHICLE COUNT (FUEL)	TOTAL FUEL (GAL)	MIN FUEL (GAL)	MAX FUEL (GAL)	AVG FUEL (GAL)	VEHICLE COUNT OIL (QTS)	TOTAL OIL (QTS)	MIN OIL (QTS)	MAX OIL (QTS)	AVG OIL (QTS)
M1008	9	4097	138	967	455.22	3	10	2	4	3.33
M1009	43	18679	35	1042	434.40	18	39	1	6	2.17
M1010	9	2397	176	455	266.33	2	3	1	2	1.50
M106A2	6	2749	303	959	458.18	4	23	1	8	5.75
M113	27	31718	285	2975	1174.74	27	895	1	93	33.15
M151A2	71	34303	18	1396	483.18	67	355	1	18	5.30
M3	26	22702	98	1911	873.15	19	387	1	76	20.37
M35A2	25	22690	179	2330	907.60	24	355	3	27	14.79
M49A2C	4	2890	540	961	722.50	4	54	3	29	13.50
M52A2	1	570	570	570	570.00	1	4	4	4	4.00
M54A2	6	2385	259	539	397.50	6	52	5	16	8.67
M551	21	17238	67	2363	820.86	11	89	1	21	8.09
M577	3	2182	642	815	727.33	3	54	11	24	18.00
M60	66	240461	1272	5113	3643.35	66	11753	30	358	178.08
M813A1	3	1883	554	742	627.67	3	19	4	9	6.33
M816	2	1299	506	793	649.50	2	37	8	29	18.50
M88A1	15	37210	263	6908	2480.67	14	761	2	246	54.36
M880	2	282	118	164	141.00	0	.	.	.	.
M886	1	128	128	128	128.00	0	.	.	.	.
M923	1	704	704	704	704.00	1	3	3	3	3.00
M932	2	2803	1231	1572	1401.50	2	10	4	6	5.00
M998	2	124	40	84	62.00	0	.	.	.	.

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JULY-DECEMBER 1984
2/6 CAVALRY SQUADRON FT. KNOX, KY.
EQUIPMENT REPORTING DATA FOR MILES, HOURS, AND FUEL
AS APPLICABLE, PER MONTH

MODEL	VEHICLE COUNT (MILES)	TOTAL MILES	MIN MILES	MAX MILES	AVG MILES	VEHICLE COUNT (HOURS)	TOTAL HOURS	MIN HOURS	MAX HOURS	AVG HOURS
M1008	4	5684	0	2273	1421.00	0	.	.	.	.
M1009	31	103795	0	7726	3348.23	0	.	.	.	.
M1010	9	10078	544	2359	1119.78	0	.	.	.	.
M106A2	6	1738	142	457	289.67	6	162	16	37	27.00
M113	27	21360	18	1431	791.11	27	3221	15	386	119.30
M151A2	61	119447	0	5945	1958.15	0	.	.	.	.
M3	23	15126	94	2126	657.65	23	2230	17	287	96.96
M35A2	21	45145	4	5796	2149.76	21	2835	2	314	135.00
M49A2C	4	4111	657	1465	1027.75	4	259	40	83	64.75
M52A2	1	657	657	657	657.00	1	97	97	97	97.00
M54A2	6	4011	57	1360	668.50	6	234	7	83	39.00
M551	21	7847	0	902	373.67	0	.	.	.	.
M577	6	1738	27	792	289.67	6	274	7	160	45.67
M60	66	53429	140	1559	809.53	66	7644	14	713	115.82
M813A1	3	3620	922	1378	1206.67	3	278	89	98	92.67
M816	2	4373	7	4366	2186.50	2	279	1	278	139.50
M88A1	8	6877	50	1772	859.63	8	1815	94	425	226.88
M880	10	3886	46	1178	388.60	0	.	.	.	.
M886	1	895	895	895	895.00	0	.	.	.	.
M932	2	5166	2312	2854	2583.00	2	317	142	175	158.50

MODEL	VEHICLE COUNT (FUEL)	TOTAL FUEL(GAL)	MIN FUEL(GAL)	MAX FUEL(GAL)	AVG FUEL(GAL)
M1008	4	464	0	200	116.00
M1009	31	6351	0	484	204.87
M1010	9	928	50	222	103.11
M106A2	6	832	57	201	138.67
M113	27	17265	127	1065	639.44
M151A2	61	13186	0	1093	216.16
M3	23	9914	160	888	431.04
M35A2	21	8121	0	1303	386.71
M49A2C	4	645	90	298	161.25
M52A2	1	204	204	204	204.00
M54A2	6	941	77	249	156.83
M551	21	5750	0	1464	273.81
M577	6	1366	58	635	227.67
M60	66	83337	290	2113	1262.68
M813A1	3	629	108	279	209.67
M816	2	795	50	745	397.50
M88A1	8	12206	712	2729	1525.75
M880	10	756	18	168	75.60
M886	1	256	256	256	256.00
M932	2	975	448	527	487.50

MODEL	VEHICLE COUNT	TOTAL MILES	TOTAL HOURS	TOTAL FUEL(GAL)	MILES PER HOUR	MILES PER FUEL(GAL)	HOURS PER FUEL(GAL)
M1008	4	5684	.	464	.	12.25	.
M1009	31	103795	.	6351	.	16.34	.
M1010	9	10078	.	928	.	10.86	.
M106A2	6	1738	162	832	10.73	2.09	0.19
M113	27	21360	3221	17265	6.63	1.24	0.19
M151A2	61	119447	.	13186	.	9.06	.
M3	23	15126	2230	9914	6.78	1.53	0.22
M35A2	21	45145	2835	8121	15.92	5.56	0.35
M49A2C	4	4111	259	645	15.87	6.37	0.40
M52A2	1	657	97	204	6.77	3.22	0.48
M54A2	6	4011	234	941	17.14	4.26	0.25
M551	21	7847	.	5750	.	1.36	.
M577	6	1738	274	1366	6.34	1.27	0.20
M60	66	53429	7644	83337	6.99	0.64	0.09
M813A1	3	3620	278	629	13.02	5.76	0.44
M816	2	4373	279	795	15.67	5.50	0.35
M88A1	8	6877	1815	12206	3.79	0.56	0.15
M880	10	3886	.	756	.	5.14	.
M886	1	895	.	256	.	3.50	.
M932	2	5166	317	975	16.30	5.30	0.33

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
EQUIPMENT REPORTING DATA FOR MILES, HOURS, FUEL,
AND OIL, AS APPLICABLE, PER MONTH

MODEL	VEHICLE COUNT (MILES)	TOTAL MILES	MIN MILES	MAX MILES	AVG MILES	VEHICLE COUNT (HOURS)	TOTAL HOURS	MIN HOURS	MAX HOURS	AVG HOURS
M1008	3	7033	1022	3577	2344.33	0	-	-	-	-
M1009	18	17770	316	3377	987.22	0	-	-	-	-
M1010	2	562	221	341	281.00	0	-	-	-	-
M106A2	4	691	49	302	172.75	4	181	5	63	35.25
M113	27	18398	49	1618	681.41	27	2363	10	195	87.52
M151A2	66	98580	20	8175	1493.64	0	-	-	-	-
M3	17	4066	6	693	239.18	17	643	1	107	37.82
M35A2	24	55876	695	5255	2328.17	24	4540	34	609	189.17
M49A2C	4	3657	640	1348	914.25	4	306	45	114	76.50
M52A2	1	474	474	474	474.00	1	35	35	35	35.00
M54A2	6	6486	505	1936	1081.00	6	541	39	142	90.17
M551	10	6053	60	1948	605.30	0	-	-	-	-
M577	3	910	128	593	303.33	3	356	83	144	118.67
M60	66	72758	218	2363	1102.40	66	10138	24	428	153.55
M813A1	3	4530	908	2640	1510.00	3	193	45	78	64.33
M816	2	2259	1091	1168	1129.50	2	140	50	90	70.00
M88A1	14	6941	54	1427	495.79	14	1008	15	181	72.00
M923	1	1132	1132	1132	1132.00	1	53	53	53	53.00
M932	2	3023	898	2125	1511.50	2	154	61	93	77.00

MODEL	VEHICLE COUNT (FUEL)	TOTAL FUEL(GAL)	MIN FUEL(GAL)	MAX FUEL(GAL)	AVG FUEL(GAL)	VEHICLE COUNT OIL(QTS)	TOTAL OIL(QTS)	MIN OIL(QTS)	MAX OIL(QTS)	AVG OIL(QTS)
M1008	3	944	32	738	314.67	3	10	2	4	3.33
M1009	18	1739	29	281	96.61	18	37	1	5	2.06
M1010	2	68	21	47	34.00	2	3	1	2	1.50
M106A2	4	388	25	172	87.80	4	18	1	8	4.50
M113	27	12584	101	1318	466.07	27	802	1	93	29.70
M151A2	66	8811	1	785	133.50	66	342	1	18	5.18
M3	17	3591	27	580	211.24	17	352	1	76	20.68
M35A2	24	9427	89	792	392.79	24	328	3	27	13.67
M49A2C	4	844	181	238	211.00	4	43	3	20	10.75
M52A2	1	90	90	90	90.00	1	4	4	4	4.00
M54A2	6	1201	115	297	200.17	6	50	5	14	8.33
M551	10	3416	22	1209	341.60	10	78	1	21	7.80
M577	3	708	146	357	236.00	3	50	7	24	16.67
M60	66	186483	387	3894	2219.44	66	11296	28	358	171.14
M813A1	3	509	129	251	183.00	3	16	3	9	5.33
M816	2	538	211	327	269.00	2	37	8	29	18.50
M88A1	14	16490	200	3168	1177.86	14	686	2	286	48.96
M923	1	217	217	217	217.00	1	3	3	3	3.00
M932	2	510	227	283	255.00	2	10	4	6	5.00

MODEL	VEHICLE COUNT	TOTAL MILES	TOTAL HOURS	TOTAL FUEL(GAL)	TOTAL OIL(QTS)	MILES PER HOUR	MILES PER FUEL(GAL)	MILES PER OIL(QTS)	HOURS PER FUEL(GAL)	HOURS PER OIL(QTS)
M1008	3	7033	-	944	10	-	7.45	703.300	-	-
M1009	18	17770	-	1739	37	-	10.22	480.270	-	-
M1010	2	562	-	68	3	-	8.26	187.333	-	-
M106A2	4	691	181	388	18	4.90	1.99	38.389	0.41	7.83
M113	27	18398	2363	12584	802	7.79	1.46	22.940	0.19	2.95
M151A2	66	98580	-	8811	342	-	11.19	288.246	-	-
M3	17	4066	643	3591	352	6.32	1.13	11.568	0.18	1.83
M35A2	24	55876	4540	9427	328	12.31	5.93	170.358	0.48	13.84
M49A2C	4	3657	306	844	43	11.95	4.33	85.047	0.36	7.12
M52A2	1	474	35	90	4	13.54	5.27	118.500	0.39	8.75
M54A2	6	6486	541	1201	50	11.99	5.40	129.720	0.45	10.82
M551	10	6053	-	3416	78	-	1.77	77.603	-	-
M577	3	910	356	708	50	2.56	1.29	18.200	0.50	7.12
M60	66	72758	10138	186483	11296	7.18	0.50	6.441	0.07	0.90
M813A1	3	4530	193	509	16	23.47	8.25	283.125	0.35	12.06
M816	2	2259	140	538	37	16.18	4.20	61.054	0.26	3.78
M88A1	14	6941	1008	16490	686	6.89	0.42	10.125	0.06	1.47
M923	1	1132	53	217	3	21.36	5.22	377.333	0.24	17.67
M932	2	3023	154	510	10	19.63	5.93	302.300	0.30	15.40

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
EQUIPMENT REPORTING DATA FOR MILES/GAL, MILES/HR, MILES/QT, HRS/GAL, AND HRS/QT

MODEL	VEHICLE COUNT	TOTAL MILES	TOTAL HOURS	MILES PER HOUR
M106A2	6	2925	536.0	5.4571
M113	27	43113	5791.0	7.4448
M3	26	23047	5077.0	4.5395
M35A2	25	105512	8683.0	12.1516
M49A2C	4	12947	1018.0	12.7181
M52A2	1	2357	148.0	15.9257
M54A2	6	12497	1248.0	10.0136
M577	3	3424	753.0	4.5471
M60	66	107508	14776.7	7.2755
M813A1	3	10183	510.0	19.9667
M816	2	4586	415.0	11.0506
M88A1	15	13541	2167.0	6.2487
M923	1	3399	155.0	21.9290
M932	2	11618	712.0	16.3174

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
EQUIPMENT REPORTING DATA FOR MILES/GAL, MILES/HR, MILES/QT, HRS/GAL, AND HRS/QT

MODEL	VEHICLE COUNT	TOTAL MILES	TOTAL FUEL(GAL)	MILES PER FUEL(GAL)
M1008	9	43124	4097	10.5258
M1009	43	204992	18498	11.0818
M1010	9	21721	2289	9.4893
M106A2	6	2737	2217	1.2345
M113	27	42547	29383	1.4480
M151A2	71	336695	32194	10.4583
M3	26	21514	18746	1.1477
M35A2	25	116406	21234	5.4821
M49A2C	4	14215	2759	5.1522
M52A2	1	2730	570	4.7895
M54A2	6	13373	2365	5.6545
M551	19	24272	16056	1.5117
M577	3	3188	2088	1.5268
M60	66	108149	225641	0.4793
M813A1	3	10756	1757	6.1218
M816	2	4586	1252	3.6629
M88A1	15	12888	34788	0.3705
M880	2	3300	282	11.7021
M886	1	785	128	6.1328
M923	1	3399	704	4.8281
M932	2	13626	2649	5.1438
M998	2	1385	124	11.1694

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
EQUIPMENT REPORTING DATA FOR MILES/GAL, MILES/HR, MILES/QT, HRS/GAL, AND HRS/QT

MODEL	VEHICLE COUNT	TOTAL MILES	TOTAL OIL(QTS)	MILES PER OIL(QTS)
M1008	3	7033.0	10.0	703.300
M1009	18	17770.0	37.0	480.270
M1010	2	562.0	3.0	187.333
M106A2	4	692.0	20.0	34.600
M113	27	18928.0	866.0	21.857
M151A2	66	97659.0	342.0	285.553
M3	18	4414.0	363.5	12.143
M35A2	24	59415.0	345.0	172.217
M49A2C	4	4204.0	54.0	77.852
M52A2	1	474.0	4.0	118.500
M54A2	6	6821.0	52.0	131.173
M551	11	6062.0	79.0	76.734
M577	3	1011.0	51.0	19.824
M60	66	66113.4	11408.0	5.795
M813A1	3	4692.0	19.0	246.947
M816	2	2259.0	37.0	61.054
M88A1	14	7272.0	711.0	10.228
M923	1	1132.0	3.0	377.333
M932	2	3023.0	10.0	302.300

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
EQUIPMENT REPORTING DATA FOR MILES/GAL, MILES/HR, MILES/QT, HRS/GAL, AND HRS/QT

MODEL	VEHICLE COUNT	TOTAL HOURS	TOTAL FUEL(GAL)	HOURS PER FUEL(GAL)
M106A2	6	495.0	2277	0.217382
M113	27	5685.0	29271	0.194220
M3	26	4693.0	18926	0.247966
M35A2	25	8632.0	19527	0.442055
M49A2C	4	1006.0	2523	0.398732
M52A2	1	148.0	489	0.302658
M54A2	6	1211.0	2306	0.525152
M577	3	705.0	2088	0.337644
M60	66	14744.9	224434	0.065698
M813A1	3	519.0	1738	0.298619
M816	2	415.0	1252	0.331470
M88A1	15	2020.0	34488	0.058571
M923	1	155.0	704	0.220170
M932	2	712.0	2566	0.277475

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
EQUIPMENT REPORTING DATA FOR MILES/GAL, MILES/HR, MILES/QT,
HRS/GAL, AND HRS/QT

MODEL	VEHICLE COUNT	TOTAL HOURS	TOTAL OIL(QTS)	HOURS PER OIL(QTS)
M106A2	4	143	21	6.8095
M113	27	2452	869	2.8216
M3	18	824	386	2.1347
M35A2	24	4397	318	13.8270
M49A2C	4	306	43	7.1163
M52A2	1	35	4	8.7500
M54A2	6	541	50	10.8200
M577	3	365	51	7.1569
M60	66	9031	11264	0.8018
M813A1	3	199	19	10.4737
M816	2	140	37	3.7838
M88A1	14	1108	706	1.5694
M923	1	53	3	17.6667
M932	2	154	10	15.4000

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
AUGUST-DECEMBER 1984
B TROOP, FIRST SQUADRON, 3RD ACR FT. BLISS, TEXAS
ALL EQUIPMENT CONTRIBUTING TO ANY GIVEN ELEMENT

MODEL	VEHICLE COUNT (MILES)	TOTAL MILES	MIN MILES	MAX MILES	AVG MILES	VEHICLE COUNT (HOURS)	TOTAL HOURS	MIN HOURS	MAX HOURS	AVG HOURS
M106A2	3	1212	360	434	404.00	3	106	28	42	35.33
M113A1	8	3944	384	760	493.00	8	420	38	80	52.50
M151A2	4	5013	433	2026	1253.25	0	-	-	-	-
M220A1	4	1095	55	388	273.75	4	97	4	38	24.25
M35A2	4	3313	224	1592	828.25	4	149	14	58	37.25
M577A1	1	314	314	314	314.00	1	34	34	34	34.00
M60A1	12	3961	182	609	330.08	12	404	16	60	33.67
M88A1	1	488	488	488	488.00	1	40	40	40	40.00

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
AUGUST-DECEMBER 1984
B TROOP, FIRST SQUADRON, 3RD ACR FT. BLISS, TEXAS
ALL EQUIPMENT CONTRIBUTING TO ANY GIVEN ELEMENT

MODEL	VEHICLE COUNT OIL (QTS)	TOTAL OIL (QTS)	MIN OIL (QTS)	MAX OIL (QTS)	AVG OIL (QTS)
M106A2	1	4	4	4	4.00
M113A1	7	69	5	21	9.86
M151A2	1	8	8	8	8.00
M220A1	3	77	19	33	25.67
M35A2	1	8	8	8	8.00
M577A1	1	2	2	2	2.00
M60A1	12	326	4	92	27.17
M88A1	1	68	68	68	68.00

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
AUGUST-DECEMBER 1984
B TROOP, FIRST SQUADRON, 3RD ACR FT. BLISS, TEXAS
EQUIPMENT REPORTING DATA FOR MILES, HOURS,
AND OIL, AS APPLICABLE, PER MONTH

MODEL	VEHICLE COUNT (MILES)	TOTAL MILES	MIN MILES	MAX MILES	AVG MILES	VEHICLE COUNT (HOURS)	TOTAL HOURS	MIN HOURS	MAX HOURS	AVG HOURS
M106A2	1	252	252	252	252.00	1	23	23	23	23.00
M113A1	7	2348	42	676	335.43	7	259	5	71	37.00
M220A1	3	899	237	383	299.67	3	85	23	38	28.33
M35A2	1	437	437	437	437.00	1	19	19	19	19.00
M577A1	1	127	127	127	127.00	1	16	16	16	16.00
M60A1	12	2636	22	542	219.67	12	266	2	59	22.17
M88A1	1	486	486	486	486.00	1	40	40	40	40.00

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
AUGUST-DECEMBER 1984
B TROOP, FIRST SQUADRON, 3RD ACR FT. BLISS, TEXAS
EQUIPMENT REPORTING DATA FOR MILES, HOURS,
AND OIL, AS APPLICABLE, PER MONTH

MODEL	VEHICLE COUNT OIL(QTS)	TOTAL OIL(QTS)	MIN OIL(QTS)	MAX OIL(QTS)	AVG OIL(QTS)
M106A2	1	4	4	4	4.00
M113A1	7	69	5	21	9.86
M220A1	3	77	19	33	25.67
M35A2	1	4	4	4	4.00
M577A1	1	2	2	2	2.00
M60A1	12	326	4	92	27.17
M88A1	1	68	68	68	68.00

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
AUGUST-DECEMBER 1984
B TROOP, FIRST SQUADRON, 3RD ACR FT. BLISS, TEXAS
EQUIPMENT REPORTING DATA FOR MILES, HOURS,
AND OIL, AS APPLICABLE, PER MONTH

MODEL	VEHICLE COUNT	TOTAL MILES	TOTAL HOURS	TOTAL OIL(QTS)	MILES PER HOUR	MILES PER OIL(QTS)	HOURS PER OIL(QTS)
M106A2	1	252	23	4	10.96	63.00	5.75
M113A1	7	2348	259	69	9.07	34.03	3.75
M220A1	3	899	85	77	10.58	11.68	1.10
M35A2	1	437	19	4	23.00	109.25	4.75
M577A1	1	127	16	2	7.94	63.50	8.00
M60A1	12	2636	266	326	9.91	8.09	0.82
M88A1	1	486	40	68	12.15	7.15	0.59

OPERATIONAL DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
ALL EQUIPMENT CONTRIBUTING TO ANY GIVEN ELEMENT

MODEL	VEHICLE COUNT (MILES)	TOTAL MILES	MIN MILES	MAX MILES	AVG MILES	VEHICLE COUNT (HOURS)	TOTAL HOURS	MIN HOURS	MAX HOURS	AVG HOURS
AVLE	6	1706	7	511	284.33	6	249	7	91	41.50
COMBT	0	.	.	.	.	4	28	1	15	7.00
D7F	0	.	.	.	.	2	182	81	101	91.00
F1500	0	.	.	.	.	1	59	59	59	59.00
F40C	0	.	.	.	.	4	90	1	64	22.50
J0410	0	.	.	.	.	1	105	105	105	105.00
JHGV75	0	.	.	.	.	2	30	14	16	15.00
MLIOCH	0	.	.	.	.	2	88	44	44	44.00
M10A	0	.	.	.	.	6	424	9	170	70.67
M10C8	22	27030	9	3597	1228.63	0	.	.	.	.
M1003	80	38984	8	5714	1483.07	0	.	.	.	.
M1015	3	441	70	200	147.00	3	67	13	30	22.33
M1028	5	1521	161	655	304.20	0	.	.	.	.
M106A2	27	14672	217	932	543.41	27	1539	16	225	60.69
M109A2	12	8521	449	1360	710.08	11	871	48	173	79.18
M109A3	40	14301	8	1440	357.52	37	1061	2	42	28.69
M113A1	139	98093	6	3399	705.74	139	10960	1	320	79.42
M123A1	2	661	230	431	330.50	2	54	22	32	27.00
M151A2	115	23085	30	13998	2418.13	0	.	.	.	.
M220A1	57	41673	119	1521	711.65	57	4457	10	297	78.18
M275A2	3	868	123	390	289.67	3	59	11	25	19.67
M35A2	146	112616	4	4310	771.35	144	7995	1	511	55.91
M36A2	2	1388	133	497	314.00	6	211	1	64	35.18
M4K	0	.	.	.	.	4	214	12	110	53.45
M49A2C	3	1256	348	543	422.00	3	590	127	314	196.67
M50A2	1	593	593	593	593.00	1	35	35	35	35.00
M52A2	13	10340	6	1918	557.76	16	581	10	130	33.94
M54A2	61	48629	7	3134	797.20	60	3551	1	353	59.18
M543A2	13	6147	13	985	614.70	13	815	12	120	61.50
M548A1	20	10393	90	1247	519.65	22	1156	10	264	57.77
M55A2	2	255	126	129	127.50	1	36	18	18	18.00
M561	10	14333	10	1333	439.67	0	.	.	.	.
M577A1	26	11510	2	474	442.69	25	3163	1	695	126.52
M578	0	1256	25	436	209.33	6	149	14	36	24.83
M60A1	162	99196	107	1554	612.32	162	11605	13	204	71.63
M728	3	2241	231	1579	747.00	3	162	25	97	54.00
M792	4	1204	34	524	301.00	1	198	198	198	198.00
M813	23	21742	55	1991	945.30	22	1537	3	239	69.86
M814	1	258	258	258	258.00	1	90	90	90	90.00
M816	3	2347	65	1385	799.00	3	81	17	43	27.00
M817	6	5719	503	1432	953.00	5	449	37	158	74.83
M818	14	10934	210	1958	781.00	4	241	3	97	30.13
M88A1	17	9493	29	1320	558.41	17	1299	7	219	76.41
M880	10	7128	26	2810	712.80	0	.	.	.	.
M883	1	1100	1100	1100	1100.00	0	.	.	.	.
M884	5	1251	33	588	250.20	0	.	.	.	.
M885	4	985	13	611	246.25	2	10	5	5	5.00
M886	5	4311	241	1547	862.20	0	.	.	.	.
M887	5	4088	37	1882	817.60	0	.	.	.	.
M890	3	4345	1142	1928	1448.33	0	.	.	.	.
M911	2	2490	600	1890	1245.00	0	.	.	.	.
M936	3	1066	67	826	355.33	3	92	9	50	30.67
M977	28	6505	2	871	232.32	27	547	2	91	20.26
M978	14	2860	44	401	204.29	14	342	2	39	24.43
P100	0	.	.	.	.	5	51	1	31	10.20
P125	0	.	.	.	.	2	2	1	1	1.00
1.5KW	0	.	.	.	.	18	2419	1	375	134.41
10KW	0	.	.	.	.	11	540	1	200	49.09
15KW	0	.	.	.	.	1	83	83	83	83.00
250000	0	.	.	.	.	2	218	1	217	109.00
3KW	0	.	.	.	.	13	610	0	202	46.92
30KW	0	.	.	.	.	4	543	30	237	135.65
4.2KW	0	.	.	.	.	12	580	10	105	48.33
5KW	0	.	.	.	.	9	1133	1	304	125.92
60KW	0	.	.	.	.	5	461	2	302	92.16
645M	0	.	.	.	.	2	178	86	92	89.00

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
ALL EQUIPMENT CONTRIBUTING TO ANY GIVEN SEGMENT

MODEL	VEHICLE COUNT (FUEL)	TOTAL FUEL(GAL)	MIN FUEL(GAL)	MAX FUEL(GAL)	AVG FUEL(GAL)	VEHICLE COUNT OIL(QTS)	TOTAL OIL(QTS)	MIN OIL(QTS)	MAX OIL(QTS)	AVG OIL(QTS
AVLB	5	3339	395	864	667.80	5	135	1	61	27.00
COSPP	4	11	1	6	2.75	3	4	1	2	1.17
DTP	2	470	222	248	235.00	2	95	10	85	47.50
F1500	1	157	157	157	157.00	1	15	15	15	15.00
G40C	3	65	10	40	21.67	3	11	1	6	3.67
J0410	1	132	132	132	132.00	1	4	4	4	4.00
J0GV75	2	23	11	12	11.50	1	6	6	6	6.00
MLT6CH	2	97	44	53	48.50	2	4	1	3	2.00
M10A	7	584	80	171	83.43	4	12	1	7	3.00
M1008	20	2344	2	341	117.18	17	40	1	9	2.35
M1009	56	6464	3	333	115.44	40	128	1	11	3.20
M1015	1	195	15	15	65.00	1	6	1	4	2.00
M1028	3	152	10	56	30.40	0	.	.	.	.
M106A2	27	6511	35	471	241.15	27	727	2	193	26.93
M109A2	12	4568	15	765	380.67	12	212	4	40	17.63
M109A3	40	2539	5	251	63.47	18	49	1	6	2.71
M113A1	134	43953	13	1937	328.01	139	3129	1	227	24.07
M123A1	2	170	68	102	85.00	1	1	1	1	1.00
M151A2	107	23406	2	1379	218.75	77	519	1	34	6.73
M220A1	57	18012	5	927	316.00	76	1156	1	140	24.22
M275A2	3	144	48	96	48.00	1	2	2	2	2.00
M35A2	145	21291	1	1014	146.83	36	608	1	96	6.33
M36A2	6	683	13	347	113.83	4	26	1	18	6.50
M45	3	133	33	52	44.33	3	6	1	3	2.00
M49A2C	3	325	40	150	108.33	3	31	1	23	10.33
M50A2	1	84	84	84	83.83	0	.	.	.	.
M52A2	16	2133	15	510	133.31	10	31	1	5	3.10
M54A2	59	8246	5	480	139.76	45	496	1	72	11.02
M543A2	10	1373	3	290	137.30	7	40	2	12	5.71
M548A1	20	1943	15	517	197.15	19	253	1	46	13.16
M553A2	2	61	14	11	30.50	0	.	.	.	.
M561	27	2673	6	234	98.67	23	163	1	20	7.09
M577A1	25	6437	20	846	259.48	22	466	1	93	21.18
M578	6	963	30	340	160.00	5	25	1	12	5.00
M60A1	162	195735	10	3634	1208.24	162	13413	1	342	82.80
M728	1	1675	121	1759	1225.00	3	27	7	11	9.00
M792	4	211	13	139	52.75	3	48	2	25	11.33
M813	23	4427	15	422	192.46	16	98	1	17	5.98
M814	1	110	110	110	110.00	0	.	.	.	.
M816	3	500	35	270	166.67	3	9	1	5	3.00
M817	6	1647	215	431	281.17	4	18	1	9	4.50
M818	14	3341	45	726	238.64	9	161	1	53	17.89
M819A1	17	17941	134	3118	1055.35	17	2362	1	522	138.94
M820	8	1355	11	454	169.38	2	6	1	5	3.00
M823	1	141	141	141	141.00	1	1	1	1	1.00
M824	5	136	15	36	27.20	3	9	2	4	3.00
M925	4	216	13	125	54.00	1	2	2	2	2.00
M836	5	707	42	207	141.40	3	5	1	2	1.67
M867	5	717	5	347	143.40	2	3	1	2	1.50
M900	3	321	75	170	107.00	2	14	7	7	7.00
M911	2	563	146	777	481.50	3	36	4	13	18.00
M916	3	176	13	36	58.67	1	1	1	1	1.00
M977	27	2115	20	209	78.33	2	8	3	5	4.00
M978	14	1286	5	177	91.86	3	8	2	3	2.67
M900	5	11	1	5	2.20	1	1	1	1	1.00
M125	2	2	1	1	1.00	0	.	.	.	.
1.25TON	14	547	1	189	30.39	14	44	1	3	3.14
10K4	11	507	1	350	46.09	1	14	1	4	4.67
1.5KW	1	94	94	94	94.00	0	.	.	.	.
2.5TON	2	252	1	251	126.00	1	7	7	7	7.00
3/4T	8	196	1	91	24.50	4	8	2	3	2.00
3TON	4	717	20	300	179.25	2	3	1	2	1.50
4.2KW	12	233	6	60	19.42	12	59	1	12	4.92
5TON	3	749	3	250	83.17	3	24	1	7	1.57
5TON	4	945	4	737	236.25	3	7	1	4	2.3
6.5KW	1	296	63	137	98.67	0	.	.	.	.

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
EQUIPMENT REPORTING DATA FOR MILES, HOURS, FUEL,
AND OIL, AS APPLICABLE, PER MONTH

MODEL	VEHICLE COUNT (MILES)	TOTAL MILES	MIN MILES	MAX MILES	AVG MILES	VEHICLE COUNT (HOURS)	TOTAL HOURS	MIN HOURS	MAX HOURS	AVG HOURS
AVLB	5	1394	77	454	278.80	5	198	7	85	39.60
COMPR	0	.	.	.	.	1	15	15	15	15.00
D7F	0	.	.	.	.	2	94	40	54	47.00
F1500	0	.	.	.	.	1	59	59	59	59.00
G40C	0	.	.	.	.	3	37	8	17	12.33
JHGV75	0	.	.	.	.	1	6	6	6	6.00
MLT6CH	0	.	.	.	.	2	24	10	14	12.00
M1008	15	12050	9	2716	803.33	0	.	.	.	.
M1009	38	28115	15	4930	739.87	0	.	.	.	.
M1015	3	441	70	200	147.00	3	67	18	30	22.33
M106A2	23	11549	168	787	502.13	23	1085	18	72	47.15
M109A2	11	5128	112	896	466.18	11	569	16	123	51.73
M109A3	13	2465	4	744	189.62	13	232	2	60	17.85
M113A1	120	70133	35	2271	584.44	120	8048	4	236	67.06
M123A1	1	39	39	39	39.00	1	5	5	5	5.00
M151A2	77	136376	10	10034	1771.12	0	.	.	.	.
M220A1	50	28582	129	1019	571.64	50	3124	10	170	62.47
M275A2	1	315	315	315	315.00	1	26	26	26	26.00
M35A2	90	44091	10	1839	489.90	90	3550	1	307	39.45
M36A2	4	489	48	228	122.25	4	86	6	64	21.50
M49A2C	3	733	10	375	244.33	3	275	3	145	91.67
M52A2	9	5672	76	1604	630.22	9	293	10	75	32.56
M54A2	41	23879	10	3166	582.41	41	1744	1	117	42.54
M543A2	7	3936	328	720	562.29	7	317	27	83	45.29
M548A1	19	7515	20	961	395.53	19	753	2	89	39.63
M561	22	10290	30	1093	467.73	0	.	.	.	.
M577A1	22	8281	20	764	376.41	22	1324	14	120	60.18
M578	5	760	25	257	152.00	5	96	13	29	19.20
M60A1	151	63372	28	1540	419.68	151	7546	1	146	49.97
M728	3	2173	291	1525	724.33	3	154	26	95	51.33
M792	3	1170	195	524	390.00	1	198	198	198	198.00
M813	16	9281	50	1562	580.06	16	868	2	242	54.25
M816	3	824	65	668	274.67	3	60	6	33	20.00
M817	4	661	30	424	165.25	4	54	1	36	13.50
M818	4	423	43	215	105.75	4	67	8	25	16.75
M88A1	16	7223	8	1280	451.44	16	991	1	215	61.94
M880	2	4980	2170	2810	2490.00	0	.	.	.	.
M883	1	1100	1100	1100	1100.00	0	.	.	.	.
M884	3	355	33	232	118.33	0	.	.	.	.
M885	1	73	73	73	73.00	0	.	.	.	.
M886	3	2543	408	1074	847.67	0	.	.	.	.
M887	2	766	146	620	383.00	0	.	.	.	.
M890	2	2049	926	1123	1024.50	0	.	.	.	.
M911	2	2185	539	1646	1092.50	0	.	.	.	.
M936	1	67	67	67	67.00	1	8	8	8	8.00
M977	2	1012	190	822	506.00	2	100	19	81	50.00
M978	3	874	275	323	291.33	3	101	28	38	33.67
P100	0	.	.	.	.	1	12	12	12	12.00
1.5KW	0	.	.	.	.	14	2059	1	370	147.07
10KW	0	.	.	.	.	3	273	2	200	91.00
250000	0	.	.	.	.	1	216	216	216	216.00
3KW	0	.	.	.	.	4	419	24	185	104.75
30KW	0	.	.	.	.	2	439	202	237	219.50
4.2KW	0	.	.	.	.	12	543	10	105	45.25
5KW	0	.	.	.	.	8	1124	16	298	140.50
60KW	0	.	.	.	.	3	76	2	59	25.33

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
EQUIPMENT REPORTING DATA FOR MILES, HOURS, FUEL,
AND OIL, AS APPLICABLE, PER MONTH

MODEL	VEHICLE COUNT (FUEL)	TOTAL FUEL (GAL)	MIN FUEL (GAL)	MAX FUEL (GAL)	AVG FUEL (GAL)	VEHICLE COUNT OIL (QTS)	TOTAL OIL (QTS)	MIN OIL (QTS)	MAX OIL (QTS)	AVG OIL (QTS)
AVLB	5	2781	205	880	548.20	5	135	1	61	27.00
COMPR	1	6	6	6	6.00	1	2	2	2	1.50
D7F	2	399	189	210	199.50	2	95	10	85	47.50
F1500	1	157	157	157	157.00	1	15	15	15	15.00
G40C	3	35	10	15	11.67	3	11	1	6	3.67
JHGV75	1	3	3	3	3.00	1	5	5	5	5.00
M1T6CH	2	56	25	31	28.00	2	4	1	3	2.00
M1008	15	1305	5	375	87.00	15	36	1	9	2.40
M1009	38	2750	5	275	72.37	38	124	1	11	3.26
M1015	3	195	15	95	65.00	3	6	1	4	2.00
M106A2	23	5386	75	471	234.17	23	690	1	188	30.00
M109A2	11	3068	98	558	278.55	11	207	4	40	18.77
M109A3	13	651	10	160	50.08	13	78	1	6	2.42
M113A1	120	34830	10	971	290.25	120	2679	1	228	22.32
M123A1	1	11	11	11	11.00	1	1	1	1	1.00
M151A2	77	12385	1	795	160.84	77	514	1	33	6.68
M220A1	50	14749	5	719	294.98	50	1017	1	73	20.78
M275A2	1	76	76	76	76.00	1	2	2	2	2.00
M35A2	70	9428	5	965	134.75	70	570	1	96	6.33
M36A2	8	350	13	161	87.50	8	26	1	18	6.50
M49A2C	3	255	10	150	85.00	3	31	1	23	10.33
M52A2	9	1210	20	480	134.44	9	29	1	8	3.22
M54A2	41	3830	5	369	93.41	41	473	1	82	11.66
M543A2	7	754	40	162	107.71	7	35	2	10	5.00
M548A1	19	2958	15	312	155.47	19	245	1	46	12.89
M561	22	1769	6	237	80.39	22	159	1	29	7.23
M577A1	22	4781	30	492	217.32	22	434	1	63	19.73
M578	5	775	30	390	155.00	5	25	1	12	5.00
M60A1	151	137252	10	1673	908.96	151	11978	1	442	79.30
M728	3	3333	421	1607	1111.00	3	27	7	11	9.00
M792	3	209	30	138	69.67	3	34	2	25	11.33
M813	16	2294	10	342	143.34	16	94	1	17	5.88
M816	3	277	12	210	92.33	3	9	1	5	3.00
M817	4	331	20	228	82.75	4	17	1	9	4.25
M818	4	271	25	183	67.75	4	64	1	28	16.00
M88A1	16	14089	5	3098	880.56	16	1873	1	300	117.06
M880	2	390	190	200	195.00	2	6	1	5	3.00
M883	1	141	141	141	141.00	1	1	1	1	1.00
M936	3	36	5	16	12.00	3	7	2	3	2.33
M985	1	30	30	30	30.00	1	2	2	2	2.00
M986	3	335	93	122	111.67	3	5	1	2	1.67
M987	2	85	20	65	42.50	2	3	1	2	1.50
M990	2	185	75	110	92.50	2	14	7	7	7.00
M911	2	883	106	777	441.50	2	34	6	28	17.00
M936	1	10	10	10	10.00	1	1	1	1	1.00
M977	2	235	82	153	117.50	2	8	2	6	4.00
M978	3	461	145	158	153.67	3	8	2	3	2.67
P100	1	3	3	3	3.00	1	1	1	1	1.00
1.5KW	14	469	1	185	33.50	14	42	1	9	3.00
10KW	3	406	6	350	135.33	3	14	1	8	4.67
250000	1	250	250	250	250.00	1	7	7	7	7.00
3KW	4	129	5	85	32.25	4	6	1	2	1.50
30KW	2	600	300	300	300.00	2	3	1	2	1.50
4.2KW	12	203	6	30	16.92	12	54	1	12	4.92
5KW	8	740	5	250	92.50	8	28	1	7	3.50
60KW	3	97	12	60	32.33	3	7	1	5	2.33

OPERATIONAL DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
EQUIPMENT REPORTING DATA FOR MILES, HOURS, FUEL,
AND OIL, AS APPLICABLE, PER MONTH

MODEL	VEHICLE COUNT	TOTAL MILES	TOTAL HOURS	TOTAL FUEL(GAL)	TOTAL OIL(QTS)	MILES PER HOUR	MILES PER FUEL(GAL)	MILES PER OIL(QTS)	HOURS PER FUEL(GAL)	HOURS PER OIL(QTS)
AVLB	5	1394	198	2781	135	7.08	0.51	10.13	0.07	1.47
COMPR	1	.	15	6	2	.	.	.	2.50	10.00
DTF	2	.	94	399	95	.	.	.	0.24	0.99
F1500	1	.	59	157	15	.	.	.	0.38	3.93
GROC	3	.	37	35	11	.	.	.	1.06	3.36
JHGV75	1	.	6	3	5	.	.	.	2.00	1.20
MLT6CR	2	.	24	56	8	.	.	.	0.43	4.00
M1008	15	12050	.	1305	16	.	9.23	138.72	.	.
M1009	38	28115	.	2750	124	.	10.22	226.73	.	.
M1015	3	441	67	195	6	6.58	2.26	73.50	0.34	11.17
M106A2	23	11549	1085	5186	690	10.65	2.14	16.78	0.20	1.57
M109A2	11	5128	569	3060	207	9.01	1.67	24.81	0.19	2.76
M109A3	13	2865	232	651	34	10.63	3.79	72.50	0.36	6.82
M113A1	120	70133	9049	34833	2679	8.71	2.01	26.18	0.23	3.00
M123A1	1	39	5	11	1	7.80	3.55	39.00	0.45	5.00
M151A2	77	136376	.	12385	518	.	11.01	263.32	.	.
M220A1	50	28582	3128	10749	1037	9.15	1.98	27.56	0.21	3.01
M275A2	1	315	26	76	2	12.12	4.14	157.50	0.34	13.00
M35A2	90	44091	3550	9429	570	12.42	4.68	77.39	0.38	6.23
M36A2	4	489	46	350	26	5.69	1.40	18.81	0.25	3.31
M39A2C	3	733	275	255	31	2.67	2.87	23.65	1.08	8.87
M52A2	9	5672	293	1210	29	19.36	4.69	195.59	0.24	10.10
M54A2	41	23879	1738	3830	478	11.69	6.23	49.97	1.46	3.65
M543A2	7	3936	317	758	35	12.42	5.22	112.86	0.42	9.06
M548A1	19	7515	753	1954	285	9.98	2.54	39.67	0.25	3.07
M561	22	10290	.	1769	159	.	5.82	64.72	.	.
M577A1	22	4281	1324	4781	834	6.25	1.73	13.08	0.28	3.05
M578	5	760	96	775	25	7.92	0.98	30.40	0.13	3.88
M60A1	151	63372	7546	137252	11978	8.40	0.46	5.29	0.05	0.63
M728	1	2171	154	1313	27	14.11	0.65	80.48	0.05	5.70
M792	3	1170	138	209	14	5.91	5.60	34.41	0.95	5.92
M813	16	4281	468	2298	98	10.69	4.05	93.73	0.38	9.23
M816	1	828	63	277	7	13.73	2.97	91.56	0.22	6.67
M817	8	661	54	131	17	12.24	2.09	38.88	0.16	3.18
M818	8	423	67	271	68	6.11	1.56	6.61	0.25	1.05
M88A1	16	7223	931	14049	1873	7.29	0.51	3.86	0.07	0.53
M880	2	4980	.	390	5	.	12.77	830.00	.	.
M883	1	1100	.	181	1	.	7.80	1100.00	.	.
M884	3	355	.	36	7	.	9.86	50.71	.	.
M885	1	73	.	30	2	.	2.43	36.50	.	.
M886	3	2543	.	335	5	.	7.59	509.60	.	.
M887	2	766	.	85	3	.	9.01	255.33	.	.
M890	2	2089	.	185	18	.	11.08	186.36	.	.
M911	2	2185	.	883	38	.	2.47	64.26	.	.
M936	1	67	8	10	1	8.38	6.70	67.00	0.80	8.00
M977	2	1012	100	235	8	10.12	4.31	126.50	0.43	12.50
M978	3	474	101	861	8	8.65	1.90	109.25	0.22	12.63
P100	1	.	12	1	1	.	.	.	4.00	12.00
1.5KW	18	.	2059	469	82	.	.	.	4.39	89.02
10KW	3	.	273	406	14	.	.	.	0.67	19.50
250000 BTU	1	.	216	250	7	.	.	.	0.86	30.86
3KW	4	.	419	129	6	.	.	.	3.25	69.83
30KW	2	.	419	600	3	.	.	.	0.73	186.33
4.2KW	12	.	543	203	59	.	.	.	2.67	9.20
5KW	8	.	1128	740	28	.	.	.	1.52	40.18
60KW	3	.	76	97	7	.	.	.	0.78	10.86

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
EQUIPMENT REPORTING DATA FOR MILES/GAL, MILES/HR, MILES/QT, HRS/GAL, AND HRS/QT

MODEL	VEHICLE COUNT	TOTAL MILES	TOTAL HOURS	MILES PER HOUR
AVLB	6	1693	249.0	6.7992
M1015	3	441	67.0	6.5821
M106A2	27	14154	1638.5	8.6384
M109A2	11	7848	871.0	9.0103
M109A3	37	12450	1060.5	11.7397
M113A1	138	96481	10939.5	8.8195
M123A1	2	405	54.0	7.5000
M220A1	57	39863	4331.5	9.2030
M275A2	3	833	59.0	14.1186
M35A2	143	100119	7521.9	13.3104
M36A2	6	1392	209.6	6.6436
M49A2C	3	1266	590.0	2.1458
M50A2	1	593	35.0	16.9429
M52A2	16	9629	528.4	18.2224
M54A2	60	46855	3551.0	13.1949
M543A2	10	6137	615.0	9.9789
M548A1	20	10382	1153.5	9.0004
M55A2	2	255	18.0	14.1667
M577A1	25	11121	3159.9	3.5194
M578	6	1256	149.0	8.4295
M60A1	162	94436	11584.6	8.1519
M728	3	2239	162.0	13.8210
M792	1	362	198.0	1.8283
M813	22	21623	1537.0	14.0683
M814	1	258	90.0	2.8667
M816	3	1306	81.0	16.1235
M817	6	5715	449.0	12.7283
M818	7	2179	216.0	10.0880
M88A1	17	9042	1299.0	6.9607
M885	2	145	10.0	14.5000
M936	3	1066	92.0	11.5870
M977	27	6503	547.0	11.8885
M978	14	2860	342.0	8.3626

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
EQUIPMENT REPORTING DATA FOR MILES/GAL, MILES/HR, MILES/QT, HRS/GAL, AND HRS/QT

MODEL	VEHICLE COUNT	TOTAL MILES	TOTAL FUEL(GAL)	MILES PER FUEL(GAL)
AVLB	5	1632	3339	0.4888
M1008	20	24956	2344	10.6487
M1009	56	87600	6464	13.5512
M1015	3	441	195	2.2615
M1028	5	1471	147	10.0095
M106A2	27	13656	6511	2.0974
M109A2	12	8504	4568	1.8616
M109A3	40	13575	2539	5.3466
M113A1	134	88768	43808	2.0263
M123A1	2	591	170	3.4765
M151A2	107	251824	23316	10.8006
M220A1	57	35450	18012	1.9681
M275A2	3	833	144	5.7847
M35A2	145	107711	21229	5.0738
M36A2	6	1871	683	2.7394
M49A2C	3	1266	325	3.8954
M50A2	1	585	84	6.9784
M52A2	16	10000	2133	4.6882
M54A2	58	48098	8181	5.8794
M543A2	10	6123	1373	4.4596
M548A1	20	10197	3943	2.5861
M55A2	2	255	61	4.1803
M561	27	14172	2670	5.3089
M577A1	25	11227	6467	1.7360
M578	6	1255	960	1.3073
M60A1	161	92970	194397	0.4782
M728	3	2228	3675	0.6063
M792	4	1204	219	5.4977
M813	23	21741	4427	4.9116
M814	1	251	110	2.2818
M816	3	2343	500	4.6860
M817	6	5687	1687	3.3711
M818	14	10443	3341	3.1257
M88A1	17	9353	17941	0.5213
M880	8	7069	1355	5.2170
M883	1	1100	141	7.8014
M884	5	752	136	5.5294
M885	4	863	216	3.9954
M886	5	4311	707	6.0976
M887	5	4068	717	5.6736
M890	3	4345	321	13.5358
M911	2	2246	963	2.3323
M936	3	1066	176	6.0568
M977	27	6503	2115	3.0747
M978	14	2860	1286	2.2240

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1995
3RD ACR FT. BLISS, TEXAS
EQUIPMENT REPORTING DATA FOR MILES/GAL, MILES/HR, MILES/QT, HRS/GAL, AND HRS/QT

MODEL	VEHICLE COUNT	TOTAL MILES	TOTAL OIL(QTS)	MILES PER OIL(QTS)
AVLB	5	1394	135.0	10.33
M1008	17	12104	40.0	302.60
M1009	40	28140	127.0	221.57
M1015	3	441	6.0	73.50
M106A2	26	12230	719.0	17.01
M109A2	12	5801	211.5	27.43
M109A3	14	2759	38.0	72.61
M113A1	130	76564	3105.8	24.65
M123A1	1	59	3.0	19.67
M151A2	77	136401	515.0	264.86
M220A1	56	31892	1354.1	23.55
M275A2	1	315	2.0	157.50
M35A2	96	48384	606.7	79.75
M36A2	4	489	26.0	18.81
M49A2C	3	733	31.0	23.65
M52A2	10	6072	31.0	195.87
M54A2	43	24179	488.9	49.46
M543A2	7	3941	40.0	98.52
M548A1	19	7541	246.0	30.65
M561	23	10327	163.0	63.36
M577A1	22	8506	461.0	18.45
M578	5	760	25.0	30.40
M60A1	160	70928	13113.8	5.41
M728	3	2173	27.0	80.48
M792	3	1170	34.0	34.41
M813	16	9281	94.0	98.73
M816	3	824	9.0	91.56
M817	4	661	17.0	38.88
M818	9	3722	161.0	23.12
M88A1	16	7572	2329.0	3.25
M880	2	4980	6.0	830.00
M883	1	1100	1.0	1100.00
M884	3	587	9.0	65.22
M885	1	73	2.0	36.50
M886	3	2543	5.0	508.60
M887	2	766	3.0	255.33
M890	2	2049	14.0	146.36
M911	2	2191	36.0	60.86
M936	1	67	1.0	67.00
M977	2	1012	8.0	126.50
M978	3	874	8.0	109.25

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3BD ACR FT. BLISS, TEXAS
EQUIPMENT REPORTING DATA FOR MILES/GAL, MILES/HR, MILES/QT, HRS/GAL, AND HRS/QT

MODEL	VEHICLE COUNT	TOTAL HOURS	TOTAL FUEL(GAL)	HOURS PER FUEL(GAL)
AVLB	5	230.0	3339	0.06888
COMPR	4	24.0	11	2.18182
D7F	2	182.0	470	0.38723
F1500	1	59.0	157	0.37580
G40C	3	84.0	65	1.29231
JD410	1	77.0	99	0.77778
JHGV75	2	29.0	23	1.26087
MLT6CH	2	69.0	97	0.71134
M10A	6	231.0	477	0.48428
M1015	3	67.0	195	0.34359
M106A2	27	1221.5	6233	0.19597
M109A2	11	865.0	4553	0.18998
M109A3	36	966.5	2244	0.43070
M113A1	133	9828.5	43145	0.22780
M123A1	2	49.0	81	0.60494
M220A1	57	3702.5	17652	0.20975
M275A2	3	59.0	144	0.40972
M35A2	139	7120.8	19524	0.36472
M36A2	5	204.0	601	0.33943
M4K	3	126.8	124	1.02258
M49A2C	3	590.0	325	1.81538
M50A2	1	32.0	84	0.38172
M52A2	15	518.2	1983	0.26132
M54A2	57	3507.0	7872	0.44551
M543A2	10	613.0	1373	0.44647
M548A1	20	1140.0	3943	0.28912
M55A2	2	18.0	61	0.29508
M577A1	24	3125.9	6269	0.49863
M578	6	148.0	960	0.15417
M60A1	162	10450.9	187080	0.05586
M728	3	156.0	3485	0.04476
M792	1	198.0	124	1.59677
M813	22	1537.0	4395	0.34976
M814	1	89.0	110	0.80909
M816	3	77.0	387	0.19897
M817	6	435.0	1687	0.25785
M818	7	215.0	670	0.32090
M88A1	17	1186.0	17641	0.06723
M885	2	10.0	35	0.28571
M936	3	92.0	176	0.52273
M977	27	547.0	2115	0.25863
M978	14	342.0	1286	0.26594
P100	5	50.0	11	4.54545
P125	2	2.0	2	1.00000
1.5KW	18	2414.4	547	4.41389
10KW	11	539.0	507	1.06312
15KW	1	70.5	94	0.75000
250000	2	218.0	252	0.86508
3KW	8	599.0	196	3.05612
30KW	4	520.4	717	0.72580
4.2KW	12	580.0	233.0	2.48927
5KW	9	1127.3	748.5	1.50608
60KW	4	445.0	945.0	0.47090
645M	2	174.0	227.0	0.76652

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
EQUIPMENT REPORTING DATA FOR MILES/GAL, MILES/HR, MILES/QT, HRS/GAL, AND HRS/QT

MODEL	VEHICLE COUNT	TOTAL HOURS	TOTAL OIL(QTS)	HOURS PER OIL(QTS)
AVLB	5	198.0	135.0	1.467
COMPR	1	15.0	1.5	10.000
D7F	2	94.0	95.0	0.989
F1500	1	59.0	15.0	3.933
G40C	3	37.0	11.0	3.364
JHGV75	1	7.0	6.0	1.167
MLT6CH	2	24.0	4.0	6.000
M10A	4	97.0	12.0	8.083
M1015	3	67.0	6.0	11.167
M106A2	25	1259.5	701.0	1.797
M109A2	11	569.0	206.5	2.755
M109A3	13	232.0	34.0	6.824
M113A1	130	8807.5	3093.8	2.847
M123A1	1	9.0	3.0	3.000
M220A1	56	3611.5	1321.1	2.734
M275A2	1	26.0	2.0	13.000
M35A2	91	3594.1	584.7	6.147
M36A2	4	86.0	26.0	3.308
M4K	3	38.0	6.0	6.333
M49A2C	3	275.0	31.0	8.871
M52A2	9	293.0	29.0	10.103
M54A2	42	1745.0	482.9	3.614
M543A2	7	317.0	35.0	9.057
M548A1	19	754.0	246.0	3.065
M577A1	22	1348.0	466.0	2.893
M578	5	96.0	25.0	3.840
M60A1	159	8461.2	12358.8	0.685
M728	3	154.0	27.0	5.704
M792	1	198.0	20.0	9.900
M813	16	868.0	94.0	9.234
M816	3	60.0	9.0	6.667
M817	4	54.0	17.0	3.176
M818	4	67.0	64.0	1.047
M88A1	16	1101.0	2321.0	0.474
M936	1	8.0	1.0	8.000
M977	2	100.0	8.0	12.500
M978	3	101.0	8.0	12.625
P100	1	12.0	1.0	12.000
1.5KW	14	2061.0	44.0	46.841
10KW	3	273.0	14.0	19.500
250000	1	216.0	7.0	30.857
3KW	4	421.0	8.0	52.625
30KW	2	439.0	3.0	146.333
4.2KW	12	543.0	59.0	9.203
5KW	8	1124.0	28.0	40.143
60KW	3	76.0	7.0	10.857

OPERATIONAL DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JULY-DECEMBER 1984
2/6 CAVALRY SQUADRON FT. KNOX, KY.
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, AND FUEL

MONTH=JULY

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL (GAL) PER MONTH	CUMULATIVE GALS
M106A2	67	67	15	15	96	96
M113	1655	1655	294	294	1340	1340
M3	3143	3143	889	889	3177	3177
M551	798	798	0	0	675	675
M577	110	110	31	31	221	221
M60	5663	5663	709	709	9556	9556
M88A1	890	890	514	514	2137	2137
M1009	10758	10758	0	0	905	905
M1010	913	913	0	0	104	104
M151A2	17048	17048	0	0	2032	2032
M35A2	5179	5179	291	291	836	836
M49A2C	393	393	36	36	84	84
M52A2	15	15	1	1	40	40
M54A2	386	386	32	32	78	78
M813A1	495	495	27	27	131	131
M816	744	744	45	45	167	167
M880	1811	1811	0	0	324	324
M886	145	145	0	0	138	138
M932	788	788	54	54	174	174

MONTH=AUGUST

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL (GAL) PER MONTH	CUMULATIVE GALS
M106A2	292	359	22	37	77	173
M113	3418	5073	402	696	1184	2524
M3	11443	14586	333	1222	964	4141
M551	1733	2531	0	0	1206	1881
M577	669	779	55	86	237	458
M60	7496	13159	904	1613	7483	17039
M88A1	866	1756	76	590	1134	3271
M1009	15374	26132	0	0	1153	2058
M1010	492	1405	0	0	60	164
M151A2	21208	38256	0	0	2131	4163
M35A2	7187	12366	425	716	1266	2102
M49A2C	307	700	28	64	86	170
M52A2	69	84	2	3	23	63
M54A2	369	755	22	54	98	176
M813A1	396	891	38	65	36	167
M816	648	1392	19	64	128	295
M880	1029	2840	0	0	255	579
M886	330	475	0	0	3	147
M932	235	1023	12	66	55	229

MONTH=SEPTEMBER

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL (GAL) PER MONTH	CUMULATIVE GALS
M106A2	355	714	27	64	208	381
M113	4363	9436	516	1212	7769	10293
M3	4977	19563	544	1766	2579	6720
M551	857	3388	0	0	600	2481
M577	500	1279	65	151	583	1041
M60	11171	24330	1290	2903	7752	24791
M88A1	1409	3165	178	768	1128	4399
M1009	11032	37164	0	0	647	2705
M1010	988	2393	0	0	69	233
M151A2	18995	57251	0	0	2101	6264
M35A2	12171	24537	556	1272	1672	3774
M49A2C	34	734	3	67	66	236
M52A2	190	274	25	28	37	100
M54A2	247	1002	10	64	127	303
M813A1	636	1527	42	107	92	259
M816	69	1461	3	67	25	320
M880	846	3686	0	0	122	701
M886	15	490	0	0	20	167
M932	1116	2139	57	123	90	283

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JULY-DECEMBER 1984
2/6 CAVALRY SQUADRON FT. KNOX, KY.
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, AND FUEL

MONTH=OCTOBER

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL (GAL) PER MONTH	CUMULATIVE GALS
M106A2	418	1132	40	104	48	429
M113	4488	13924	706	1918	1584	11877
M3	2183	21746	229	1995	1663	8383
M551	2604	5992	0	0	734	3215
M577	287	1566	113	264	83	1124
M60	11232	35562	1930	4833	26543	51334
M88A1	1222	4387	360	1128	2678	7077
M1008	1218	1218	0	0	200	200
M1009	27141	64305	0	0	1524	4229
M1010	2477	4870	0	0	318	551
M151A2	21894	79145	0	0	2425	8689
M35A2	12082	36619	412	1684	1168	4942
M49A2C	1580	2314	81	148	194	430
M52A2	327	601	64	92	67	167
M54A2	1806	2808	105	169	240	543
M813A1	1212	2739	79	196	140	399
M816	683	2144	41	109	66	386
M880	75	3761	0	0	16	717
M886	294	784	0	0	60	227
M932	1282	3421	94	217	271	558

MONTH=NOVEMBER

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL (GAL) PER MONTH	CUMULATIVE GALS
M106A2	355	1487	30	134	182	611
M113	5104	19028	975	2893	3760	15637
M3	1574	23320	333	2328	1810	10193
M551	364	6356	0	0	511	3726
M577	154	1720	44	308	146	1270
M60	10175	45737	1598	6431	19989	71323
M88A1	1354	5741	483	1611	2479	9556
M1008	1947	3165	0	0	194	394
M1009	26212	90517	0	0	1386	5615
M1010	1244	6114	0	0	70	621
M151A2	21863	101008	0	0	2703	11392
M35A2	7634	44253	707	2391	1486	6388
M49A2C	733	3084	45	193	64	494
M52A2	0	601	0	92	0	167
M54A2	724	3532	40	209	222	765
M813A1	733	3472	79	265	165	564
M816	1092	1236	56	164	282	668
M880	46	3807	0	0	0	717
M886	50	834	0	0	19	246
M932	1267	4698	68	285	253	907

MONTH=DECEMBER

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL (GAL) PER MONTH	CUMULATIVE GALS
M106A2	511	1998	61	195	221	832
M113	2770	21798	177	3270	1703	17340
M3	2176	25496	112	2640	1701	11898
M551	1783	8139	0	0	2024	5750
M577	191	1911	30	338	96	1366
M60	8467	54204	1272	7703	13451	84774
M88A1	1373	7114	239	1850	3100	12656
M1008	2519	5684	0	0	195	589
M1009	13493	104010	0	0	847	6462
M1010	1964	13079	0	0	307	928
M151A2	18540	119548	0	0	2042	11434
M35A2	6919	51172	512	2903	2120	8508
M49A2C	1067	4111	69	262	151	645
M52A2	56	657	5	97	37	204
M54A2	659	4191	38	247	176	941
M813A1	245	3717	22	287	65	629
M816	1137	4371	115	279	127	795
M880	125	3932	0	0	39	756
M886	61	895	0	0	10	256
M932	478	5166	32	317	168	975

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=JANUARY

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
M106A2	906	906	113	113	472.0	472.0	0	0
M113	3002	3002	408	408	2300.0	2300.0	4	4
M3	2012	2012	1001	1001	2896.0	2896.0	0	0
M551	1164	1164	0	0	650.0	650.0	0	0
M577	138	138	21	21	71.0	71.0	3	3
M60	10103	10103	1432	1432	14820.0	14820.0	146	146
M88A1	543	543	65	65	2422.0	2422.0	20	20
M1010	640	640	0	0	108.0	108.0	0	0
M151A2	18491	18491	0	0	1843.8	1843.8	6	6
M35A2	6643	6643	566	566	1456.0	1456.0	10	10
M49A2C	903	903	85	85	131.0	131.0	0	0
M52A2	59	59	9	9	0.0	0.0	0	0
M54A2	104	104	23	23	20.0	20.0	0	0
M813A1	497	497	26	26	95.0	95.0	0	0
M816	129	129	10	10	30.0	30.0	0	0
M932	408	408	50	50	154.0	154.0	0	0

MONTH=FEBRUARY

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
M106A2	385	1291	117	230	361	833.0	3	3
M113	4520	7522	616	1024	2730	5030.0	116	120
M3	2990	5002	624	1625	3132	6028.0	40	40
M551	341	1505	0	0	778	1428.0	10	10
M577	522	660	83	104	361	432.0	4	7
M60	6941	17044	952	2384	15198	30018.0	1696	1842
M88A1	373	916	113	178	2528	4950.0	17	37
M1009	3929	3929	0	0	327	327.0	7	7
M151A2	26912	45403	0	0	2955	4798.8	57	63
M35A2	9199	15842	1055	1621	1809	3265.0	38	48
M49A2C	864	1767	189	274	183	314.0	8	8
M52A2	280	339	7	16	46	46.0	0	0
M54A2	749	853	138	161	214	234.0	3	3
M813A1	2584	3081	95	121	268	363.0	6	6
M816	302	431	73	83	159	189.0	1	1
M880	1073	1073	0	0	90	90.0	0	0
M932	794	1202	123	173	250	404.0	0	0

MONTH=MARCH

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
M106A2	340	1631	55.0	285.0	262.1	1095.1	0	3
M113	3916	11438	546.0	1570.0	3698.0	8728.0	0	120
M3	2897	7899	923.0	2448.0	3306.0	9334.0	0	40
M551	1201	2706	0.0	0.0	724.0	2152.0	0	10
M577	692	1352	93.0	197.0	191.0	613.0	0	7
M60	8030	25074	974.7	3358.7	19444.0	49462.0	0	1842
M88A1	1039	1955	152.0	330.0	3169.0	8119.0	0	37
M1008	3550	3550	0.0	0.0	140.0	140.0	0	0
M1009	26361	30290	0.0	0.0	1688.0	2015.0	0	7
M1010	1826	2466	0.0	0.0	526.0	634.0	0	0
M151A2	26193	71596	0.0	0.0	3528.0	8326.8	0	63
M35A2	10547	26389	888.0	2509.0	2512.0	5777.0	0	48
M49A2C	1981	3748	118.0	392.0	388.0	702.0	0	8
M52A2	286	625	39.0	55.0	149.0	195.0	0	0
M54A2	1696	2549	269.0	430.0	344.0	578.0	0	3
M813A1	753	3834	99.0	210.0	227.0	590.0	0	6
M816	565	996	61.0	144.0	184.0	373.0	0	1
M880	1113	2186	0.0	0.0	83.0	173.0	0	0
M932	783	2185	108.0	281.0	390.0	784.0	0	0

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=APRIL

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
M106A2	510.0	2141	122	807.0	786	1841.1	3	6
M113	4285.0	15723	630	2200.0	2507	11235.0	181	261
M3	2219.0	10118	508	2956.0	1702	11036.0	51	91
M551	3882.0	6188	0	0.0	1068	3220.0	19	29
M577	461.0	1813	83	280.0	203	816.0	1	8
M60	6804.4	31878	814	4172.7	12833	62295.0	1624	3466
M88A1	1107.0	3062	183	513.0	3039	11158.0	120	157
M1008	1637.0	5187	0	0.0	135	275.0	0	0
M1009	17342.0	47632	0	0.0	2157	9172.0	14	21
M1010	939.0	3405	0	0.0	196	830.0	0	0
M151A2	32220.0	103816	0	0.0	2211	10537.8	31	94
M35A2	7691.0	34080	531	3040.0	1290	7067.0	56	104
M49A2C	819.0	4567	71	463.0	389	1091.0	15	23
M52A2	176.0	901	17	72.0	39	238.0	0	0
M54A2	789.0	3338	119	548.0	266	844.0	4	11
M813A1	444.0	4278	28	238.0	115	705.0	0	6
M816	176.0	1172	23	147.0	41	418.0	0	1
M880	185.0	2371	0	0.0	25	198.0	0	0
M923	297.0	297	20	20.0	99	89.0	0	0
M932	983.0	3168	67	348.0	296	1080.0	0	0

MONTH=MAY

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
M106A2	118	2259	34	441.0	50	1891.1	0	6
M113	3752	19475	527	2727.0	2597	13832.0	121	382
M3	2212	12330	441	3397.0	1490	12526.0	23	114
M551	2050	8238	0	0.0	1532	4752.0	6	35
M577	234	2047	47	327.0	79	895.0	10	18
M60	8134	40012	877	5049.7	13876	76171.0	1367	4833
M88A1	699	3761	141	654.0	1818	12976.0	235	392
M1008	5869	11056	0	0.0	549	824.0	0	0
M1009	12249	59881	0	0.0	1353	5525.0	0	21
M1010	2479	5884	0	0.0	186	1016.0	0	0
M151A2	28582	132398	0	0.0	3257	13798.8	115	209
M35A2	11955	46035	1192	4232.0	2293	9360.0	41	145
M49A2C	826	5391	92	555.0	202	1293.0	8	31
M52A2	64	865	6	78.0	21	255.0	1	3
M54A2	1021	4359	63	611.0	203	1047.0	15	26
M813A1	996	5274	46	284.0	113	818.0	9	15
M816	642	1814	70	237.0	107	521.0	3	4
M923	507	804	25	45.0	133	222.0	2	2
M932	1310	4478	64	412.0	253	1333.0	6	6

MONTH=JUNE

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
M106A2	147	2406	29	470.0	74	1965.1	0	6
M113	3244	22719	378	3105.0	1681	15473.0	175	557
M3	1123	13453	216	3613.0	635	13161.0	42	156
M551	7427	15665	0	0.0	4782	9538.0	27	62
M577	158	2205	23	350.0	48	943.0	4	22
M60	10783	50795	2057	7106.7	18850	95021.0	2556	7389
M88A1	2131	5892	225	879.0	2692	15668.0	79	471
M1008	4685	15701	0	0.0	359	1183.0	1	1
M1009	16570	76451	0	0.0	1328	6849.0	4	25
M1010	2284	8168	0	0.0	203	1219.0	1	1
M151A2	44592	176990	0	0.0	4696	18890.8	66	275
M35A2	12738	58773	866	5098.0	2135	11895.0	54	199
M49A2C	1329	6722	3	555.0	236	1529.0	11	42
M52A2	47	912	0	78.0	8	263.0	0	3
M54A2	1183	5542	8	619.0	89	1136.0	3	29
M813A1	835	6109	0	284.0	50	868.0	0	15
M816	252	2066	21	258.0	97	618.0	1	5
M880	43	2414	0	0.0	5	203.0	0	0
M886	82	82	0	0.0	14	14.0	0	0
M923	484	1288	19	64.0	80	302.0	0	2
M932	2008	6486	0	412.0	83	1416.0	0	6

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=JULY

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
M106A2	203	2609	21	491.0	125	2090	2	8
M113	2399	25118	287	3392.0	1786	17259	89	646
M3	4009	17462	755	4368.0	2371	15532	27	183
M551	510	16175	0	0.0	812	10386	10	72
M577	410	2615	35	385.0	373	1116	1	23
M60	7558	58349	869	7975.7	11856	106877	2452	9841
M88A1	799	6691	122	1001.0	2009	17677	41	512
M1008	2961	18662	0	0.0	328	1511	3	8
M1009	13297	89748	0	0.0	1300	8149	3	28
M1010	2198	10366	0	0.0	208	1423	0	1
M151A2	35907	212897	0	0.0	2900	21391	16	291
M35A2	10809	83582	619	5717.0	2905	14400	51	250
M49A2C	842	7504	76	631.0	183	1718	9	51
M52A2	326	1238	0	78.0	73	336	0	3
M54A2	1455	6997	73	692.0	246	1382	4	33
M813A1	991	7100	45	329.0	209	1077	0	15
M816	169	2235	10	268.0	87	705	20	25
M880	50	2464	0	0.0	5	208	0	0
M886	104	186	0	0.0	16	30	0	0
M923	297	1585	12	76.0	63	365	0	2
M932	1334	7820	56	468.0	250	1666	2	8

MONTH=AUGUST

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
M106A2	205	2814	28	519.0	38	2128	0	8
M113	4903	30021	650	4042.0	2606	19865	17	663
M3	2720	20182	665	5033.0	1853	17385	118	301
M551	3739	19914	0	0.0	2438	12780	0	72
M577	170	2785	151	536.0	203	1519	5	28
M60	8769	67118	1223	9198.7	19758	126631	385	10226
M88A1	1246	7937	205	1206.0	3428	21101	59	571
M1008	2503	21165	0	0.0	278	1789	0	4
M1009	15226	104974	0	0.0	1158	9303	1	29
M1010	2794	13160	0	0.0	199	1622	0	1
M151A2	37265	250162	0	0.0	3160	24551	15	306
M35A2	9782	79164	442	6159.0	1681	16081	25	275
M49A2C	1530	9094	107	738.0	290	2008	0	51
M52A2	184	1422	11	89.0	34	370	0	3
M54A2	1029	8026	79	771.0	168	1550	7	40
M813A1	472	7572	39	368.0	170	1247	0	15
M816	373	2608	30	298.0	136	841	6	31
M880	31	2495	0	0.0	5	213	0	0
M886	183	369	0	0.0	9	39	0	0
M923	508	2093	20	96.0	76	441	0	2
M932	1075	8895	44	512.0	175	1881	0	8

MONTH=SEPTEMBER

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
M106A2	469	3283	52	571.0	184	2308	0	9
M113	6555	36576	767	4809.0	4397	24262	0	663
M3	1124	21306	412	5445.0	1212	18597	0	301
M551	2082	21996	0	0.0	1373	14153	0	72
M577	399	3184	64	600.0	278	1797	0	28
M60	16752	83870	2265	11463.7	37995	164626	0	10226
M88A1	1745	9682	295	1501.0	4604	25705	0	571
M1008	2753	23918	0	0.0	242	2031	0	4
M1009	17401	122375	0	0.0	1485	10748	0	29
M1010	2606	15766	0	0.0	243	1865	0	1
M151A2	39521	289683	0	0.0	3895	28446	0	306
M35A2	14351	93715	473	6632.0	2230	18311	0	275
M49A2C	796	9890	56	794.0	98	2106	0	51
M52A2	75	1497	5	98.0	25	395	0	3
M54A2	352	8378	33	804.0	92	1642	0	40
M813A1	856	8428	36	404.0	193	1440	0	15
M816	631	3239	44	342.0	182	1023	0	31
M880	220	2715	0	0.0	18	231	0	0
M886	26	395	0	0.0	19	58	0	0
M923	360	2453	14	110.0	98	539	0	2
M932	1209	10104	55	567.0	295	2136	0	8

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=OCTOBER

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
M106A2	8	3291	1	572.0	0	2308	0	8
M113	4679	41255	479	5288.0	3931	28193	136	799
M3	2189	23495	391	5836.0	2108	20705	53	354
M551	1923	23919	0	0.0	934	15087	3	75
M577	70	3254	31	631.0	72	1869	0	28
M60	16141	100011	2192	13655.7	37342	201968	600	10826
M88A1	2305	11987	381	1882.0	5052	30757	68	639
M1008	3503	33421	0	0.0	1050	3081	4	8
M1009	27530	149905	0	0.0	2902	13650	4	33
M1010	2718	18484	0	0.0	261	2126	2	3
M151A2	25735	315418	0	0.0	2086	30532	27	333
M35A2	14946	108661	1159	7791.0	1522	19833	18	293
M49A2C	1108	10998	71	865.0	194	2300	0	51
M52A2	422	1919	9	101.0	54	449	0	3
M54A2	1197	9575	78	882.0	190	1832	5	45
M813A1	959	9387	28	432.0	131	1571	0	15
M816	400	3639	21	363.0	119	1142	0	31
M880	172	2887	0	0.0	11	242	0	0
M886	99	493	0	0.0	19	77	0	0
M923	321	2774	17	127.0	81	620	0	2
M932	1132	11236	60	627.0	309	2465	0	8

MONTH=NOVEMBER

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
M106A2	171	3462	25	597.0	197	2505	12	20
M113	2747	44002	624	5912.0	1685	29878	78	877
M3	1408	24899	257	6093.0	1006	21711	28	382
M551	1687	25606	0	0.0	1677	16764	13	88
M577	216	3470	51	682.0	118	1987	25	53
M60	9038	109045	1357	15012.7	19283	221251	888	11714
M88A1	1271	13258	197	2079.0	3248	34005	101	740
M1008	4670	38091	0	0.0	427	3508	2	10
M1009	30585	180490	0	0.0	1049	16699	5	38
M1010	2343	20827	0	0.0	151	2277	0	3
M151A2	25222	340640	0	0.0	2094	32626	6	339
M35A2	8702	117363	719	8510.0	1399	21232	39	332
M49A2C	2080	13078	104	969.0	303	2603	0	51
M52A2	460	2379	25	129.0	52	501	0	3
M54A2	2107	11682	237	1119.0	291	2123	5	50
M813A1	1027	10414	60	482.0	152	1723	2	17
M816	586	4225	30	393.0	92	1224	4	35
M880	97	2984	0	0.0	15	257	0	0
M886	94	587	0	0.0	18	95	0	0
M923	0	2774	0	127.0	0	620	0	2
M932	1618	12854	68	695.0	187	2632	0	8
M998	1046	1046	0	0.0	90	90	0	0

MONTH=DECEMBER

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
M106A2	373	1835	55	652.0	248	2789	3	23
M113	2204	46206	306	6218.0	1840	31718	18	895
M3	284	25183	199	6292.0	991	22702	5	387
M551	600	26206	0	0.0	474	17238	1	89
M577	92	3562	92	774.0	195	2182	1	54
M60	9281	118326	1196	16208.7	19210	240461	39	11753
M88A1	829	14087	153	2232.0	3205	37210	21	761
M1008	5205	43296	0	0.0	589	4097	0	10
M1009	25260	205750	0	0.0	1980	18679	1	39
M1010	1583	22410	0	0.0	120	2397	0	3
M151A2	16493	357133	0	0.0	1677	34303	16	355
M35A2	6524	123887	739	9249.0	1458	22690	23	355
M49A2C	2101	15179	134	1103.0	287	2890	3	54
M52A2	410	2789	29	157.0	69	570	1	4
M54A2	1967	13649	159	1278.0	262	2385	2	52
M813A1	1101	11515	71	553.0	160	1883	2	19
M816	490	4715	32	425.0	75	1299	2	17
M880	316	3300	0	0.0	25	282	0	0
M886	198	785	0	0.0	33	128	0	0
M923	625	3399	28	155.0	88	708	1	3
M932	1180	14034	67	762.0	171	2803	2	10
M998	339	1385	0	0.0	34	124	0	0

OPERATIONAL DATA
MIL-L-21260 OE/HDO 15w-40 GRADE OIL FIELD VALIDATION PROGRAM
AUGUST-DECEMBER 1984
B TROOP, FIRST SQUADRON, 6TH ACR FT. BLISS, TEXAS
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, AND OIL

MONTH=AUGUST

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	OIL (QT) PER MONTH	CUMULATIVE QTS
M106A2	173	173	12	12	0	0
M113A1	436	436	47	47	42	42
M220A1	121	121	11	11	23	23
M577A1	33	33	4	4	0	0
M60A1	437	437	44	44	140	140
M88A1	54	54	5	5	12	12

MONTH=SEPTEMBER

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	OIL (QT) PER MONTH	CUMULATIVE QTS
M106A2	190	363	17	29	0	0
M113A1	520	956	50	97	5	47
M220A1	63	184	5	16	0	23
M577A1	96	129	9	13	0	0
M60A1	732	1169	54	98	32	172
M88A1	125	179	12	17	8	20
M35A2	361	361	0	0	4	4

MONTH=OCTOBER

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	OIL (QT) PER MONTH	CUMULATIVE QTS
M106A2	764	1127	65	94	4	4
M113A1	2115	3071	233	330	16	63
M220A1	726	904	70	86	38	61
M577A1	127	256	16	29	2	2
M60A1	2083	3852	290	388	144	316
M88A1	307	486	28	40	48	68
M151A2	2502	2502	0	0	0	0
M35A2	1121	1482	84	89	4	8

MONTH=NOVEMBER

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	OIL (QT) PER MONTH	CUMULATIVE QTS
M106A2	78	1205	10	104	0	4
M113A1	862	3933	89	419	6	69
M220A1	180	1384	11	97	16	77
M577A1	58	314	5	34	0	2
M60A1	94	3946	13	401	10	326
M151A2	2078	4580	0	0	0	0
M35A2	1810	3292	56	145	0	8

MONTH=DECEMBER

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	OIL (QT) PER MONTH	CUMULATIVE QTS
M106A2	7	1212	2	186	0	4
M113A1	11	3944	1	420	0	69
M220A1	11	1095	0	97	0	77
M60A1	15	3961	3	404	0	126
M88A1	2	488	0	40	0	68
M151A2	433	5013	0	0	8	8
M35A2	21	3513	4	149	0	8

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1995
3RD ACR FT. BLISS, TEXAS
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=JANUARY

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
AVLB	88	88	16.0	16.0	115.0	115.0	3.0	3.0
M106A2	1034	1034	101.0	101.0	631.0	631.0	22.6	22.6
M109A2	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M113A1	5662	5662	932.0	932.0	3696.0	3696.0	174.6	174.6
M220A1	2191	2191	280.0	280.0	1515.0	1515.0	76.0	76.0
M548A1	7	7	3.0	3.0	10.0	10.0	2.0	2.0
M577A1	526	526	89.0	89.0	294.0	294.0	15.0	15.0
M578	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M60A1	5067	5067	728.0	728.0	15392.0	15392.0	766.0	766.0
M728	82	82	15.0	15.0	125.0	125.0	2.0	2.0
M88A1	503	503	56.0	56.0	256.0	256.0	30.0	30.0
M1008	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M1009	1709	1709	0.0	0.0	332.0	332.0	18.0	18.0
M1028	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M109A3	815	815	88.0	88.0	100.0	100.0	4.0	4.0
M123A1	30	30	5.0	5.0	0.0	0.0	2.0	2.0
M151A2	24541	24541	0.0	0.0	517.3	517.3	27.6	27.6
M275A2	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M35A2	8035	8035	837.3	837.3	2664.5	2664.5	98.2	98.2
M36A2	46	46	7.0	7.0	161.0	161.0	10.0	10.0
M49A2C	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M50A2	6	6	3.0	3.0	0.0	0.0	0.0	0.0
M52A2	250	250	11.0	11.0	30.0	30.0	0.0	0.0
M54A2	1543	1543	80.0	80.0	338.0	338.0	8.0	8.0
M543A2	182	182	18.0	18.0	65.0	65.0	0.0	0.0
M55A2	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M561	667	667	0.0	0.0	74.0	74.0	1.0	1.0
M792	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M813	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M814	116	116	79.0	79.0	25.0	25.0	0.0	0.0
M816	260	260	8.0	8.0	40.0	40.0	0.0	0.0
M817	252	252	24.0	24.0	192.0	192.0	5.0	5.0
M818	1381	1381	11.0	11.0	233.0	233.0	0.0	0.0
M880	1561	1561	0.0	0.0	928.0	928.0	0.0	0.0
M883	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M884	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M885	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M886	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M887	184	184	0.0	0.0	40.0	40.0	0.0	0.0
M890	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M911	675	675	0.0	0.0	372.0	372.0	18.0	18.0
M936	0	0	0.0	0.0	0.0	0.0	0.0	0.0
COMPR	0	0	0.0	0.0	0.0	0.0	0.0	0.0
D7F	0	0	0.0	0.0	0.0	0.0	0.0	0.0
F1500	0	0	0.0	0.0	0.0	0.0	0.0	0.0
G40C	0	0	25.0	25.0	12.0	12.0	0.0	0.0
JD410	6	6	0.0	0.0	12.0	12.0	1.0	1.0
JHGV75	0	0	0.0	0.0	0.0	0.0	0.0	0.0
MLI6CB	0	0	0	0	0	0	0	0
M10A	922	922	47	47	92	92	0	0
94E	13	13	5	5	8	8	0	0
P100	0	0	0	0	0	0	0	0
P125	0	0	0	0	0	0	0	0
1.5KW	0	0	55	55	47	47	3	3
10KW	0	0	1	1	1	1	0	0
15KW	0	0	0	0	0	0	0	0
250000	0	0	0	0	0	0	0	0
3KW	0	0	25	25	31	31	1	1
30KW	0	0	0	0	0	0	0	0
4.2KW	0	0	0	0	0	0	0	0
5KW	0	0	2	2	0	0	0	0
60KW	0	0	0	0	0	0	0	0
645B	2	2	0	0	40	40	0	0

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=FEBRUARY

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
AVLB	16	104	1.0	17.0	7.0	122.0	0.0	3.0
M106A2	2919	3953	205.0	306.0	1069.0	1700.0	219.0	241.6
M109A2	977	977	127.0	127.0	725.0	725.0	48.0	48.0
M113A1	16680	22342	2031.0	2963.0	7749.0	11445.0	642.0	816.6
M220A1	7935	10126	922.0	1202.0	3900.0	5415.0	305.8	381.8
M548A1	1285	1292	111.0	114.0	587.0	597.0	19.0	21.0
M577A1	1713	2239	318.9	407.9	965.0	1259.0	75.0	90.0
M578	1	1	1.0	1.0	0.0	0.0	0.0	0.0
M60A1	18211	23278	1496.0	2724.0	37229.0	52621.0	1577.0	2343.0
M728	176	258	32.0	47.0	230.0	355.0	6.0	8.0
M88A1	1599	2102	214.0	270.0	2719.0	2975.0	203.0	293.0
M1008	1392	1392	0.0	0.0	149.0	149.0	0.0	0.0
M1009	6206	7915	0.0	0.0	806.0	939.0	1.0	19.0
M102d	28	28	0.0	0.0	8.0	8.0	0.0	0.0
M109A3	2934	3749	136.0	224.6	394.0	584.0	10.0	14.0
M123A1	39	69	5.0	10.0	11.0	11.0	1.0	2.0
M151A2	36310	50651	0.0	0.0	3256.9	3773.8	98.0	104.1
M275A2	33	33	0.0	0.0	0.0	0.0	0.0	0.0
M35A2	13148	21183	730.0	1567.3	3058.0	5722.5	62.0	130.2
M36A2	536	584	78.0	85.0	165.0	326.0	2.0	18.0
M49A2C	128	128	60.0	60.0	75.0	75.0	24.0	24.0
M50A2	354	359	11.0	14.0	60.0	60.8	1.0	2.0
M52A2	871	1121	51.2	62.2	91.0	121.0	2.0	2.0
M54A2	11652	13195	834.0	924.0	1670.0	2008.8	222.9	225.9
M543A2	219	401	41.0	59.0	72.0	137.0	5.0	5.0
M55A2	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M561	1961	2628	0.0	0.0	376.0	450.0	15.0	17.0
M792	173	173	0.0	0.0	18.0	18.0	2.0	2.0
M813	3761	3761	331.0	331.0	338.0	338.0	4.0	4.0
M814	0	116	0.0	79.0	0.0	25.0	0.0	0.0
M816	79	339	4.0	12.0	50.0	90.0	0.0	0.0
M817	150	402	12.0	36.0	90.0	242.0	4.0	9.0
M818	370	1751	46.0	57.0	281.0	514.0	35.0	35.0
M880	4692	6253	0.0	0.0	397.0	1315.0	3.0	3.0
M883	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M884	312	312	0.0	0.0	25.0	25.0	0.0	0.0
M885	0	0	0.0	0.0	0.0	0.0	0.0	0.0
M886	623	623	0.0	0.0	100.0	100.0	0.0	0.0
M887	870	1054	0.0	0.0	200.0	240.0	0.0	0.0
M890	48	48	0.0	0.0	5.0	5.0	1.0	1.0
M911	3	678	0.0	0.0	0.0	372.0	0.0	13.0
M936	0	0	0.0	0.0	0.0	0.0	0.0	0.0
COMPB	0	0	5.0	5.0	2.0	2.0	0.0	0.0
D7F	0	0	0.0	0.0	0.0	0.0	0.0	0.0
F1500	0	0	0.0	0.0	0.0	0.0	0.0	0.0
G40C	0	0	10.0	35.0	3.0	15.0	0.0	0.0
JD410	13	13	0.0	0.0	21.0	33.0	0.0	4.0
JHGV75	0	0	9.0	9.0	3.0	3.0	0.0	0.0
MLT6CH	0	0	28.0	28.0	3.0	3.0	0	0
M10A	18	940	49.0	96.0	126.0	218.0	0	0
M4R	0	13	2.8	7.8	3.0	6.0	0	0
P100	0	0	3.0	3.0	3.0	3.0	0	0
P125	0	0	2.0	2.0	2.0	2.0	0	0
1.5KW	0	0	368.4	423.4	83.0	130.0	24	0
10KW	0	0	2.0	3.0	2.0	3.0	0	0
15KW	0	0	1.5	1.5	2.0	2.0	0	0
25000C	0	0	0.0	0.0	0.0	0.0	0	0
3KW	0	0	2.0	27.0	2.0	33.0	0	1
30KW	0	0	1.4	1.4	2.0	2.0	0	0
4.2KW	0	0	157.0	157.0	170.0	170.0	35	35
5KW	0	0	0.3	0.3	0.5	0.5	0	0
60KW	0	0	0.0	0.0	0.0	0.0	0	0
645B	6	8	0.0	0.0	29.0	49.0	1	0

OPERATIONAL DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=MARCH

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
AVLB	569	673	59.0	75.0	800.0	922	77.0	80.0
M106A2	5820	9773	933.0	1239.0	2413.0	4113	195.4	437.0
M109A2	3307	4784	374.0	501.0	2291.0	3016	63.5	111.5
M113A1	35326	57668	4114.0	7077.0	16757.0	29202	1179.1	1995.7
M220A1	12999	23125	1543.0	2745.0	5473.0	10888	455.2	837.0
M548A1	4814	9106	595.0	784.0	1766.0	2363	97.0	119.0
M577A1	5021	7260	824.0	1231.0	2595.0	3854	216.0	306.0
M578	462	463	62.0	63.0	210.0	210	1.0	1.0
M60A1	37957	61235	4496.4	7220.4	70026.0	122647	5626.8	7969.8
M728	541	796	32.0	79.0	1252.0	1607	10.0	19.0
M88A1	3852	5954	493.0	768.0	7055.0	10030	1250.0	1543.0
M1008	11257	12649	0.0	0.0	1254.0	1403	4.0	4.0
M1009	35554	43469	0.0	0.0	1961.0	2899	13.0	32.0
M1028	1134	1222	0.0	0.0	70.0	73	0.0	0.0
M109A3	4769	8518	502.9	727.5	1238.0	1822	14.0	32.0
M123A1	336	405	44.0	54.0	70.0	81	0.0	3.0
M151A2	32323	153174	0.0	0.0	7854.0	11623	97.4	201.3
M275A2	833	866	58.0	58.0	144.0	144	0.0	0.0
M35A2	41685	62368	3923.4	4440.7	9342.0	12665	198.5	303.7
M36A2	1039	1523	102.0	187.0	239.0	515	0.0	24.0
M49A2C	1133	1266	330.0	330.0	250.0	325	7.0	11.0
M50A2	0	359	0.0	14.0	0.0	81	0.0	3.0
M52A2	7241	9662	311.0	373.2	1534.0	1659	17.0	19.0
M54A2	23017	35212	1932.0	2956.0	4030.0	6039	182.0	407.0
M543A2	4051	4452	353.0	412.0	872.0	1009	27.0	33.0
M55A2	255	255	18.0	18.0	81.0	81	3.0	3.0
M561	5588	8216	0.0	0.0	913.0	1363	46.0	93.0
M792	366	549	0.0	0.0	48.0	66	3.0	5.0
M813	7643	11404	702.0	1033.0	2039.0	2379	34.0	88.0
M814	135	251	10.0	34.0	45.0	110	0.0	3.0
M816	1209	1548	38.0	45.0	285.0	375	5.0	6.0
M817	3698	4100	191.0	226.0	925.0	1207	9.0	9.0
M818	6407	8156	142.0	199.0	2159.0	2673	11.0	16.0
M880	816	7069	0.0	0.0	40.0	1355	0.0	9.0
M883	1100	1100	0.0	0.0	141.0	141	1.0	1.0
M884	445	557	0.0	0.0	41.0	66	0.0	2.0
M885	115	115	0.0	0.0	10.0	10	0.0	1.0
M886	1548	2171	0.0	0.0	261.0	361	7.0	8.0
M887	1791	2345	0.0	0.0	390.0	540	0.0	0.0
M890	1928	1976	0.0	0.0	148.0	153	4.0	5.0
M911	1454	2132	0.0	0.0	488.0	869	17.0	30.0
M936	0	7	0.0	2.0	0.0	1	0.0	0.0
COMPB	0	0	8.0	8.0	2.0	4	0.0	1.0
D7F	0	0	94.0	94.0	399.0	399	25.0	45.0
F1500	0	0	59.0	59.0	157.0	157	15.0	15.0
G40C	0	0	7.0	42.0	5.0	20	0.0	0.0
JD410	0	19	77.0	77.0	99.0	132	0.0	4.0
JHGV75	0	0	2.0	15.0	3.0	6	1.0	1.0
MLI6CH	0	0	11	39.0	35	38.0	1	1
M10A	0	940	25	121.0	54	272.0	0	0
M4K	0	13	6	13.8	0	6.0	0	0
P100	0	0	20	23.0	5	8.0	1	1
P125	0	0	0	2.0	0	2.0	0	0
1.5KW	0	0	1935	2358.4	400	530.0	13	40
10KW	0	0	529	532.0	489	492.0	13	13
15KW	0	0	69	70.5	92	94.0	0	0
250000	0	0	216	216.0	250	250.0	7	7
3KW	0	0	555	582.0	154	187.0	6	6
30KW	0	0	489	490.4	695	697.0	3	3
4.2KW	0	0	386	543.0	33	203.0	4	50
5KW	0	0	1124	1124.3	740	740.5	28	28
60KW	0	0	424	424.0	900	900.0	5	5
6458	0	8	0	0.0	0	59.0	0	0

OPERATIONAL DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=APRIL

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
AVLB	419	1092	41.0	116.0	821	1743	45.0	125.0
M106A2	2424	12197	187.0	1426.0	938	5051	119.0	556.0
M109A2	1316	6100	171.0	672.0	543	3559	48.0	159.5
M113A1	14340	72008	1486.0	8563.0	4063	32265	406.1	2401.4
M220A1	7279	30404	709.0	2454.0	2585	13473	150.1	987.1
M548A1	1609	7715	193.0	902.0	554	2917	72.0	190.0
M577A1	1264	8524	257.0	1488.9	891	4735	54.0	360.0
M578	182	645	20.0	83.0	350	560	2.0	3.0
M60A1	11135	72430	1187.5	7407.9	21962	144609	2265.0	10235.8
M728	0	799	0.0	76.0	0	1607	0.0	18.0
M88A1	1012	6966	188.0	951.0	2100	12130	584.0	2127.0
M1009	2516	15165	0.0	0.0	224	1627	8.0	11.0
M1009	2919	40388	0.0	0.0	171	3070	0.0	32.0
M1028	35	1257	0.0	0.0	40	118	0.0	0.0
M109A3	712	4230	24.0	756.5	147	1169	0.0	32.0
M123A1	0	403	0.0	84.0	0	81	0.0	8.0
M151A2	37059	193233	0.0	0.0	3035	14663	88.0	220.0
M275A2	0	660	0.0	54.0	0	144	0.0	0.0
M35A2	15249	78117	973.2	5464.9	2272	14937	110.0	483.7
M36A2	261	1374	10.0	206.0	68	683	0.0	36.0
M48A2C	0	1266	0.0	230.0	0	825	0.0	31.0
M50A2	75	434	4.0	18.0	2	63	0.0	0.0
M52A2	347	3709	34.5	407.7	144	1403	4.0	22.0
M54A2	4073	40285	216.0	3072.0	538	4677	12.0	418.0
M543A2	611	7063	84.0	496.0	62	1171	4.0	36.0
M55A2	0	255	1.5	19.5	0	61	0.0	0.0
M561	1540	9756	0.0	0.0	327	1690	21.0	44.0
M792	0	539	0.0	0.0	0	66	0.0	8.0
M813	1447	12451	111.0	1144.0	539	2917	12.0	70.0
M814	7	258	1.0	30.0	0	110	0.0	0.0
M816	19	1567	2.0	47.0	0	375	0.0	5.0
M817	129	4229	11.0	237.0	32	1239	0.0	12.0
M818	929	9087	17.0	210.0	144	3817	0.0	20.0
M990	0	7069	0.0	0.0	0	1355	0.0	0.0
M883	0	1100	0.0	0.0	0	141	0.0	1.0
M884	10	617	0.0	0.0	0	98	0.0	0.0
M885	122	237	0.0	0.0	0	10	0.0	0.0
M886	1170	3341	0.0	0.0	129	491	0.0	4.0
M887	60	2905	0.0	0.0	15	555	0.0	0.0
M890	325	2301	0.0	0.0	32	185	0.0	0.0
M911	109	2241	0.0	0.0	63	923	4.0	34.0
M936	0	0	0.0	0.0	0	0	0.0	0.0
COMPB	0	0	4.0	12.0	0	4	0.0	0.0
D7F	0	0	0.0	94.0	0	379	0.0	15.0
F1500	0	0	0.0	59.0	0	157	0.0	15.0
J40C	0	0	0.0	48.0	10	30	0.0	0.0
JD410	0	19	0.0	77.0	0	132	0.0	4.0
JHGV75	0	0	4.0	14.0	2	4	4.0	8.0
MLI6CB	0	0	1.0	40.0	0	38.0	0	1
M10A	0	940	35.0	156.0	45	317.0	8	8
M4K	0	13	7.0	20.8	0	6.0	0	0
P100	0	0	1.0	24.0	0	8.0	0	1
P125	0	0	0.0	2.0	0	2.0	0	0
1.5KW	0	0	5.0	2363.4	0	530.0	0	0
10KW	0	0	1.0	533.0	0	492.0	0	16
15KW	0	0	0.0	70.5	0	94.0	0	0
250000	0	0	0.0	216.0	0	250.0	0	0
3KW	0	0	3.5	595.5	0	187.0	0	0
30KW	0	0	3.0	490.4	0	297.0	0	0
4.2KW	0	0	2.0	545.0	5	203.0	0	10
5KW	0	0	0.0	1124.3	0	740.5	0	18
60KW	0	0	15.0	439.0	25	325.0	1	0
645M	0	8	0.0	1.0	0	69.0	0	0

OPERATIONAL DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=MAY

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
AVLB	44.0	1136	6.0	122.0	41.0	1784	0	125.0
M106A2	731.0	12928	43.5	1469.5	668.0	5719	91	637.0
M109A2	871.0	6971	79.0	750.0	350.0	3909	38	197.5
M113A1	4686.0	76694	376.5	9939.5	3037.0	35302	352	2753.8
M220A1	1944.0	32348	110.5	3564.5	1110.0	14583	109	1096.1
M548A1	1109.0	8824	88.0	990.0	378.0	3295	22	212.0
M577A1	572.0	9096	84.0	1572.0	453.0	5138	58	418.0
M578	80.0	725	7.0	90.0	40.0	600	3	6.0
M60A1	4706.0	77136	537.5	9005.4	8903.0	153412	1237	11472.9
M728	1.0	800	0.0	79.0	0.0	1607	0	18.0
M88A1	764.0	7730	118.0	1069.0	1304.0	13434	80	2207.0
M1008	4037.2	19202	0.0	0.0	240.6	1368	0	17.0
M1009	8038.4	54426	0.0	0.0	430.4	3500	1	35.0
M1028	176.4	1433	0.0	0.0	20.0	138	1	0.0
M109A3	262.0	9492	13.0	768.5	50.0	2019	1	33.0
M123A1	40.0	445	0.0	54.0	0.0	81	0	3.0
M151A2	26095.0	216328	0.0	0.0	2356.0	17019	61	351.0
M275A2	0.0	466	0.0	99.0	0.0	144	0	2.0
M35A2	10429.5	48546	447.7	5917.6	2153.0	17090	93	706.7
M36A2	1.5	1675	1.0	207.6	0.0	983	0	26.0
M49A2C	0.0	1266	0.0	590.0	0.0	325	0	31.0
M50A2	0.0	434	0.0	13.0	0.0	93	0	2.0
M52A2	707.7	9417	73.7	481.4	195.0	1998	4	27.0
M54A2	3385.0	43670	127.0	3139.0	832.0	7209	15	434.9
M543A2	442.0	5505	48.0	544.0	127.0	1198	0	86.0
M55A2	0.0	255	2.1	21.6	0.0	61	0	0.0
M561	1553.0	11309	0.0	0.0	226.0	1916	13	94.0
M792	76.0	615	0.0	0.0	6.0	72	1	7.0
M813	4778.0	17629	207.0	1351.0	756.0	3673	21	71.0
M814	0.0	258	0.0	30.0	0.0	110	0	0.0
M816	35.0	1602	2.0	49.0	0.0	375	0	0.0
M817	156.0	4385	32.0	269.0	50.0	1289	2	14.0
M818	983.0	10070	0.0	216.0	337.0	3154	57	156.0
M880	59.0	7128	0.0	0.0	0.0	1355	0	0.0
M883	0.0	1100	0.0	0.0	0.0	141	0	1.0
M884	25.0	843	0.0	0.0	0.0	66	0	0.0
M885	149.0	386	0.0	0.0	13.0	23	0	0.0
M886	269.0	3610	0.0	0.0	46.0	536	0	4.0
M887	0.0	2995	0.0	0.0	0.0	565	0	0.0
M890	1916.0	4217	0.0	0.0	119.0	304	7	34.0
M911	0.0	2241	0.0	0.0	0.0	923	0	34.0
M936	893.0	893	58.0	58.0	80.0	80	1	1.0
COMPB	0.0	0	0.0	12.0	0.0	4	0	1.0
D7F	0.0	0	0.0	84.0	0.0	339	0	15.0
P1500	0.0	0	0.0	59.0	0.0	157	0	15.0
340C	0.0	0	17.0	65.0	10.0	40	1	1.0
JD410	0.0	19	0.0	77.0	0.0	132	0	4.0
JHGV75	0.0	0	1.0	20.0	0.0	8	1	0.0
MLT6CH	0	0	14.0	54.0	31	69.0	3	4
S10A	0	940	37.0	193.0	0	317.0	0	0
S4K	0	13	14.0	34.8	10	16.0	2	2
P100	0	0	0.0	24.0	0	8.0	0	0
P125	0	0	0.0	2.0	0	2.0	0	0
1.5KW	0	0	0.0	2363.4	0	530.0	0	0.0
10KW	0	0	0.0	533.0	0	492.0	0	1.0
15KW	0	0	5.0	75.5	0	94.0	0	0
250000	0	0	0.0	216.0	0	250.0	0	0
3KW	0	0	2.4	587.9	0	137.0	0	0
30KW	0	0	7.2	497.6	0	697.0	0	0
4.2KW	0	0	30.0	575.0	15	223.0	0	5.0
5KW	0	0	5.0	1129.3	0	740.5	0	2.0
60KW	0	0	12.8	451.8	0	925.0	0	0
645B	0	8	0.0	0.0	0	69.0	0	0

OPERATIONAL DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=JUNE

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
AVLB	126	1262	52.0	174.0	405.0	2189	6	131.0
M106A2	1311	14239	125.0	1594.5	557.0	6276	87	724.0
M109A2	671	7642	67.0	817.0	366.0	4275	7	204.5
M113A1	9046	85740	986.0	9835.5	3713.0	39015	276	3029.8
M220A1	5927	38175	659.0	4223.5	2253.0	19836	216	1312.1
M548A1	713	9537	56.5	1046.5	286.0	3581	24	336.0
M577A1	873	4969	191.0	1763.9	427.0	5515	71	449.0
M578	198	923	14.0	104.0	120.0	720	12	18.0
M60A1	13269	80405	1635.2	10640.6	21448.5	174861	1159	12631.8
M728	12	812	0.0	85.0	0.0	1607	0	13.0
M88A1	385	8115	72.0	1141.0	1475.0	14909	32	2239.0
M1008	1583	20785	0.0	0.0	694.0	1962	0	17.0
M1009	7158	61584	0.0	0.0	486.0	3986	14	49.0
M1028	41	1474	0.0	0.0	14.0	152	0	0.0
M109A3	522	10014	69.0	837.5	25.0	2044	0	33.0
M123A1	82	527	0.0	94.0	46.0	127	0	3.0
M151A2	19398	235726	0.0	0.0	1951.0	13870	71	439.0
M275A2	0	866	0.0	59.0	0.0	144	0	2.0
M35A2	3358	96304	358.3	4875.9	1165.5	18255	82	548.7
M36A2	0	1881	1.5	209.1	0.0	583	0	30.0
M49A2C	0	1260	0.0	530.0	0.0	325	0	31.0
M50A2	33	472	9.0	27.0	4.0	57	0	2.0
M52A2	120	3537	18.0	439.4	30.0	928	2	27.0
M54A2	1748	45418	206.0	3405.0	246.0	7455	56	483.0
M543A2	399	5904	35.0	579.0	120.0	1618	1	27.0
M55A2	0	255	2.5	24.1	0.0	61	0	2.0
M561	735	12094	0.0	0.0	113.0	2029	17	111.0
M792	138	753	0.0	0.0	9.0	61	0	0.0
M813	3153	20782	146.0	1497.0	582.0	4255	4	80.0
M814	0	258	0.0	80.0	0.0	110	0	0.0
M816	41	1693	8.0	55.0	12.0	387	1	6.0
M817	250	4635	21.0	300.0	109.0	1398	4	18.0
M818	465	10335	25.0	241.0	123.0	3277	4	19.0
M880	0	7128	0.0	0.0	0.0	1355	0	0.0
M883	0	1100	0.0	0.0	0.0	141	0	1.0
M884	0	843	0.0	0.0	0.0	66	0	2.0
M885	149	535	0.0	0.0	22.0	45	0	0.0
M886	185	3795	0.0	0.0	63.0	393	0	4.0
M887	368	3273	0.0	0.0	62.0	617	0	5.0
M890	19	4236	0.0	0.0	1.0	305	0	14.0
M911	6	2247	0.0	0.0	0.0	423	2	30.0
M936	0	493	0.0	58.0	0.0	91	1	1.0
COMPB	0	0	0.0	12.0	0.0	4	0	0.0
D7F	0	0	0.0	94.0	0.0	399	0	15.0
P150D	0	0	0.0	59.0	0.0	157	0	15.0
340C	0	0	0.0	65.0	0.0	40	0	1.0
JD410	0	19	28.0	195.0	0.0	132	0	4.0
JHGV75	0	0	0.0	20.0	0.0	3	0	4.0
MLT6CH	0	0	18	72.0	0	69.0	0	4
M10A	0	940	56	349.0	45	362.0	0	3
M4K	0	13	8	42.3	8	24.0	0	3
P100	0	0	0	39.0	0	8.0	0	1
P125	0	0	0	2.0	0	2.0	0	0
1.5KW	0	0	0	2363.4	0	530.0	0	13
10KW	0	0	0	533.0	0	492.0	0	13
15KW	0	0	1	76.5	0	34.0	0	2
250000	0	0	0	216.0	0	250.0	0	7
3KW	0	0	5	592.9	0	187.0	0	5
30KW	0	0	30	527.6	20	717.0	0	9
4.2KW	0	0	0	575.0	0	223.0	0	59
5KW	0	0	1	1110.3	0	740.5	0	20
60KW	0	0	2	453.8	0	925.0	0	6
645B	0	0	0	0.0	0	69.0	0	0

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=JULY

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
AVLE	58	1320	5	179.0	0	2189	0	131.0
M106A2	209	14448	25	1619.5	185	6461	1	725.0
M109A2	121	7763	28	845.0	210	4485	0	704.5
M113A1	3491	89231	341	9166.5	1556	40571	13	3042.8
M220A1	356	38531	37	4260.5	331	17167	1	1313.1
M548A1	575	10112	47	1093.5	180	3761	3	244.0
M577A1	44	10013	4	1767.9	17	5632	2	451.0
M578	258	1181	17	121.0	60	780	4	22.0
M60A1	541	80946	61	10701.5	1497	176358	195	12996.8
M728	55	867	2	87.0	342	1949	0	14.0
M88A1	195	8310	27	1168.0	364	15273	18	1267.0
M1008	5491	46276	0	0.0	192	2154	4	23.7
M1009	17734	79319	0	0.0	1043	5029	20	49.0
M1015	371	371	37	37.0	180	180	5	5.0
M1028	47	1521	0	0.0	0	152	0	0.0
M109A3	531	10545	46	883.5	122	2166	0	33.0
M123A1	134	601	0	54.0	43	170	0	1.0
M151A2	9509	245235	0	0.0	1293	20263	20	432.5
M275A2	0	966	0	59.0	0	144	0	2.0
M35A2	4972	101876	229	7104.4	647	18952	5	533.7
M36A2	3	1684	2	211.1	0	683	0	18.0
M49A2C	0	1266	0	590.0	0	329	0	11.0
M50A2	3	475	1	28.0	0	67	0	0.0
M52A2	15	4752	13	512.4	0	2028	0	37.0
M54A2	196	45604	19	3424.0	260	7715	0	438.0
M543A2	3	5907	0	674.0	0	1318	0	37.0
M55A2	0	456	2	26.1	0	61	0	2.0
M561	1010	13104	0	0.0	136	2225	21	132.0
M792	65	818	35	35.0	5	86	12	21.0
M813	0	20782	0	1497.0	0	4255	0	90.0
M814	0	458	0	90.0	0	110	0	3.0
M816	550	2243	0	55.0	58	445	0	5.0
M817	294	4929	11	301.0	42	1440	0	19.0
M818	399	10934	0	241.0	64	3341	1	101.0
M880	0	7128	0	0.0	0	1355	0	5.0
M883	0	1100	0	0.0	0	141	0	1.0
M884	232	1075	0	0.0	0	65	2	4.0
M885	219	754	0	0.0	58	133	2	3.0
M886	108	3333	0	0.0	15	614	0	4.0
M887	0	3273	0	0.0	0	617	0	4.0
M890	0	4236	0	0.0	0	805	2	14.0
M911	237	2484	0	0.0	40	963	0	20.0
M936	0	893	0	54.0	0	80	0	1.0
M977	24	24	0	6.0	225	225	1	2.0
CCMER	0	0	0	12.0	0	4	0	2.0
D7F	0	0	0	94.0	0	399	0	45.0
F1500	0	0	0	59.0	0	157	0	15.0
G40C	0	0	5	70.0	0	40	0	1.0
JD410	0	19	0	105.0	0	132.0	0	4
JHGV75	0	0	3	23.0	3	11.0	0	0
MLT6CB	0	0	5	77.0	15	84.0	0	4
M10A	50	990	84	333.0	35	337.0	0	8
M4K	0	13	13	55.8	0	24.0	0	0
P100	0	0	0	24.0	0	8.0	0	1
P125	0	0	0	2.0	0	2.0	0	0
1.5KW	0	0	0	2363.4	0	530.0	0	42
10KW	0	0	0	533.0	0	492.0	0	13
15KW	0	0	6	82.5	0	94.0	0	1
250000	0	0	0	216.0	0	250.0	0	7
3KW	0	0	0	592.9	0	197.0	0	4
30KW	0	0	15	542.6	0	717.0	0	3
4.2KW	0	0	0	575.0	0	223.0	0	56
5KW	0	0	2	1132.3	5	745.5	0	28
60KW	0	0	1	454.8	0	425.0	0	0
645M	0	4	2	2.0	30	33.0	0	0

OPERATIONAL DATA
MIL-L-21040 OE/HDO 152-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=AUGUST

MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
AVLB	0	1320	0	179.0	0	2189	0.0	131.0
M106A2	224	14672	19	1638.5	50	6511	2.0	727.0
M109A2	758	8521	26	871.0	93	4568	7.0	211.5
M113A1	4281	93512	324	10490.5	1890	42461	63.0	3102.8
M220A1	2147	40678	196	4456.5	845	18012	43.0	1356.1
M548A1	136	10309	12	1135.5	142	3903	3.0	247.0
M577A1	790	10803	1321	3038.9	530	6162	7.0	458.0
M578	50	1231	13	134.0	150	930	2.0	74.0
M60A1	4081	35027	473	11174.6	11163	187521	451.0	13277.3
M728	0	867	0	87.0	0	1949	0.0	19.0
M88A1	273	8583	89	1207.0	665	15938	37.0	2354.0
M1003	488	26764	0	0.0	120	2274	6.0	27.0
M1009	6229	35547	0	0.0	1003	6032	43.0	112.0
M1015	0	371	0	37.0	0	190	0.0	6.0
M1028	0	1541	0	0.0	0	152	0.0	0.0
M109A3	2917	13462	146	1029.5	422	2389	5.0	18.0
M123A1	0	991	0	54.0	0	170	0.0	4.0
M151A2	13570	264835	0	0.0	1631	21894	52.0	434.6
M275A2	0	986	0	58.0	0	144	0.0	2.0
M35A2	4517	136393	476	7580.9	965	19817	17.0	670.7
M36A2	0	1984	0	211.1	0	983	0.0	76.0
M49A2C	0	1265	0	590.0	0	325	0.0	31.0
M50A2	0	440	0	30.0	0	67	0.0	2.0
M52A2	412	3964	17	523.4	85	2113	3.0	80.0
M54A2	629	46233	14	3443.0	91	7796	1.0	430.4
M543A2	138	8045	21	800.0	40	1358	0.0	37.0
M55A2	0	255	0	26.1	0	61	0.0	0.0
M561	509	13713	0	0.0	53	2278	18.0	151.0
M792	89	937	0	35.0	14	100	5.0	20.0
M813	244	21026	12	1509.0	57	4312	0.0	90.0
M814	0	258	0	90.0	0	110	0.0	7.0
M816	39	2332	5	50.0	20	405	2.0	8.0
M817	89	5018	4	305.0	13	1453	5.0	18.0
M818	0	10934	0	241.0	0	8341	0.0	161.0
M880	0	7128	0	0.0	0	1355	0.0	6.0
M893	0	1100	0	0.0	0	141	0.0	1.0
M984	143	1218	0	0.0	55	121	0.0	5.0
M985	158	912	10	10.0	53	196	0.0	1.0
M896	0	3903	0	0.0	0	614	0.0	4.0
M987	920	3893	0	0.0	65	682	0.0	2.0
M990	109	4345	0	0.0	16	321	0.0	14.0
M911	0	2484	0	0.0	0	463	0.0	26.0
M936	0	893	0	93.0	0	80	0.0	1.0
M977	3563	3587	351	357.0	907	1132	2.0	2.0
M978	957	957	126	126.0	384	384	0.0	0.0
CCMEB	0	0	16	23.0	7	11	1.0	3.5
D7F	0	0	0	94.0	0	399	0.0	15.0
F1500	0	0	0	53.0	0	157	1.0	15.0
G40C	0	0	20	40.0	25	65.0	10	11
JD410	0	13	0	105.0	0	132.0	0	4
JHG875	0	0	7	30.0	12	23.0	0	5
MLT6CH	0	0	11	88.0	13	97.0	0	4
M10A	0	390	47	390.0	91	498.0	3	5
M4K	0	13	73	128.8	45	69.0	2	5
P100	0	0	27	51.0	3	11.0	0	1
P125	0	0	0	2.0	0	2.0	0	0
1.5KW	0	0	4	2367.4	4	534.0	1	43
10KW	0	0	4	537.0	12	504.0	1	14
15KW	0	0	0	42.5	0	94.0	0	0
250000	0	0	0	216.0	0	250.0	0	7
3KW	0	0	11	603.9	5	192.0	0	4
30KW	0	0	0	542.6	0	717.0	0	8
4.2KW	0	0	5	590.0	10	233.0	0	69
5KW	0	0	1	1133.3	3	748.5	0	22
60KW	0	0	0	454.8	0	925.0	0	5
645M	0	6	4	6.0	0	99.0	0	5

OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
MONTHLY CUMULATIVE DATA FOR MILES, HOURS, FUEL, AND OIL

MONTH=SEPTEMBER

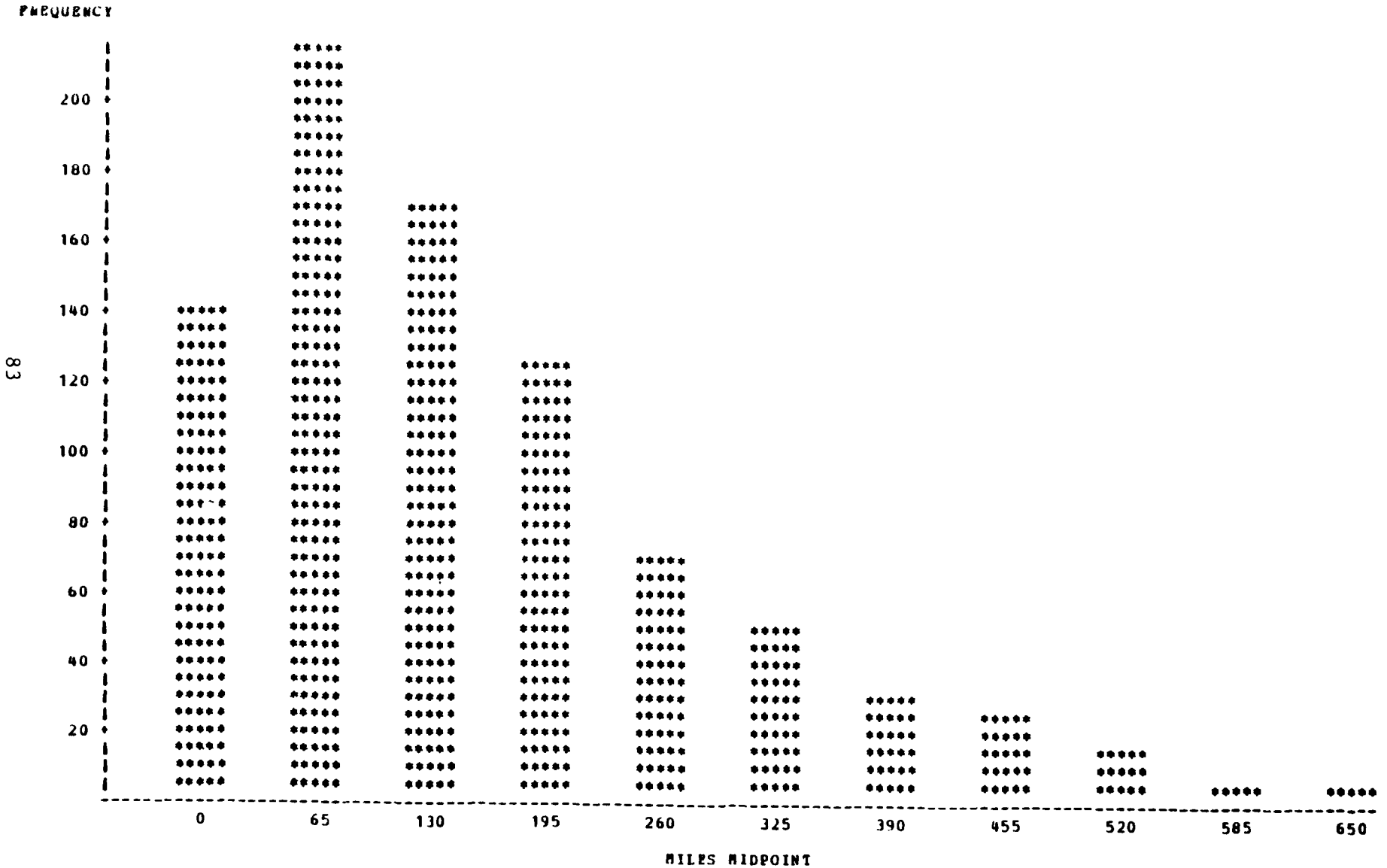
MODEL	MILES PER MONTH	CUMULATIVE MILES	HOURS PER MONTH	CUMULATIVE HOURS	FUEL(GAL) PER MONTH	CUMULATIVE GALS	OIL(QT) PER MONTH	CUMULATIVE QTS
AVLE	386	1706	70	249.0	1150.0	3339	4	135.0
M106A2	0	14672	0	1638.5	0.0	6511	0	727.0
M109A2	0	8521	0	971.0	0.0	4569	0	211.5
M113A1	4586	98098	469	10959.5	1492.0	43953	26	3128.8
M220A1	0	40678	0	4456.5	0.0	18012	0	1356.1
M548A1	85	10393	30	1155.5	40.0	3943	3	350.0
M577A1	707	11510	74	3162.0	325.0	5487	3	466.0
M578	25	1256	15	149.0	30.0	960	1	25.0
M60A1	4163	99196	430	11604.6	8214.0	195735	135	13412.2
M728	1374	2241	75	162.0	1726.0	3675	9	27.0
M88A1	910	9493	92	1269.0	2003.0	17341	9	2362.0
M100	256	27030	0	0.0	70.0	2344	11	40.0
M1009	3437	53994	0	0.0	4432.0	6464	16	128.0
M1015	70	441	30	67.0	15.0	195	1	6.0
M1028	0	1521	0	0.0	0.0	152	0	0.0
M109A3	639	14301	32	1061.5	151.0	2539	2	32.0
M123A1	0	561	0	54.0	0.0	173	0	3.0
M151A2	13280	278085	0	0.0	1512.0	33406	34	514.0
M275A2	0	566	0	59.0	0.0	144	0	0.0
M35A2	6223	112616	414	7394.4	1474.0	21291	37	1417.7
M36A2	0	1444	0	211.1	0.0	483	0	20.0
M49A2C	0	1266	0	240.0	0.0	935	0	41.0
M50A2	113	593	5	15.0	17.0	84	0	2.0
M52A2	76	10040	12	241.4	20.0	1133	1	31.0
M54A2	2396	43629	108	3881.0	450.0	4246	5	496.5
M543A2	102	9147	15	615.0	15.0	1373	3	40.0
M55A2	0	235	0	26.1	0.0	61	0	2.0
M561	1277	14990	0	0.0	391.5	2670	13	163.0
M792	297	1204	163	138.0	119.0	219	1	24.0
M813	716	21742	28	1137.0	115.0	4427	14	44.0
M814	0	253	0	30.0	0.0	110	0	2.0
M816	65	2397	21	81.0	35.0	500	3	4.0
M817	730	5713	144	449.0	234.0	1687	0	13.0
M818	0	10934	0	241.0	0.0	3341	2	161.0
M880	0	7128	0	0.0	0.0	1355	0	0.0
M883	0	1100	0	0.0	0.0	141	0	1.0
M884	33	1251	0	0.0	15.0	136	3	3.0
M885	73	945	0	10.0	30.0	216	2	2.0
M886	408	4311	0	0.0	93.0	707	3	24.0
M887	195	4084	0	0.0	35.0	717	1	9.0
M890	0	4345	0	0.0	0.0	821	0	14.0
M911	0	2490	0	0.0	0.0	963	0	60.0
M936	173	1006	34	92.0	46.0	176	0	1.0
M977	2918	8535	100	547.0	583.0	2115	4	4.0
M978	1903	2660	216	342.0	302.0	1236	3	3.0
COMPR	0	0	0	23.0	0.0	11	0	1.5
DTP	0	0	38	182.0	71.0	470	0	17.0
P1500	0	0	0	27.0	0.0	157	1	15.0
340C	0	0	0	90.0	0	65.0	0	11
JD410	0	19	0	105.0	0	132.0	0	4
JHGV75	0	0	0	10.0	0	23.0	0	0
MLT6CH	0	0	0	33.0	0	97.0	0	4
M10A	0	990	44	424.0	46	284.0	1	12
M4K	0	13	85	213.8	54	133.0	1	6
P100	0	0	0	51.0	0	11.0	0	1
P125	0	0	0	2.0	0	2.0	0	0
1.5KW	0	0	52	2419.4	13	347.0	1	44
10KW	0	0	8	540.0	3	507.0	0	14
15KW	0	0	0	82.5	0	94.0	0	2
250000	0	0	2	218.0	2	252.0	0	7
3KW	0	0	6	609.9	4	196.0	0	5
4.2KW	0	0	0	580.0	0	233.0	0	10
5KW	0	0	0	1133.3	0	748.5	0	24
60KW	0	0	0	460.8	20	945.0	1	7
645M	0	4	172	178.0	197	296.0	0	0

APPENDIX D

Distribution Frequencies

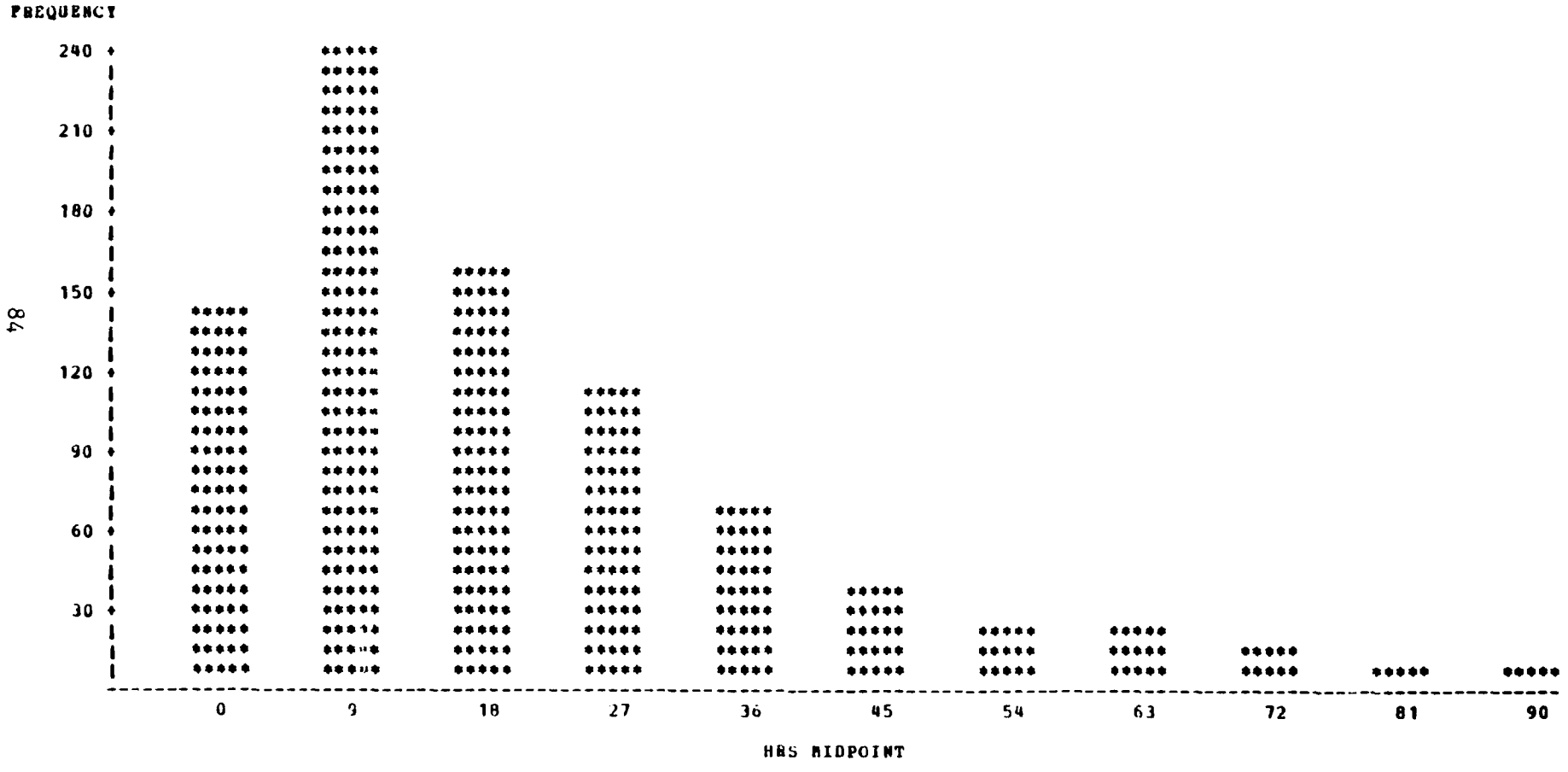
OPERATIONAL DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=COMBAT TRACKED VEHICLE, AVDS 1790

FREQUENCY BAR CHART



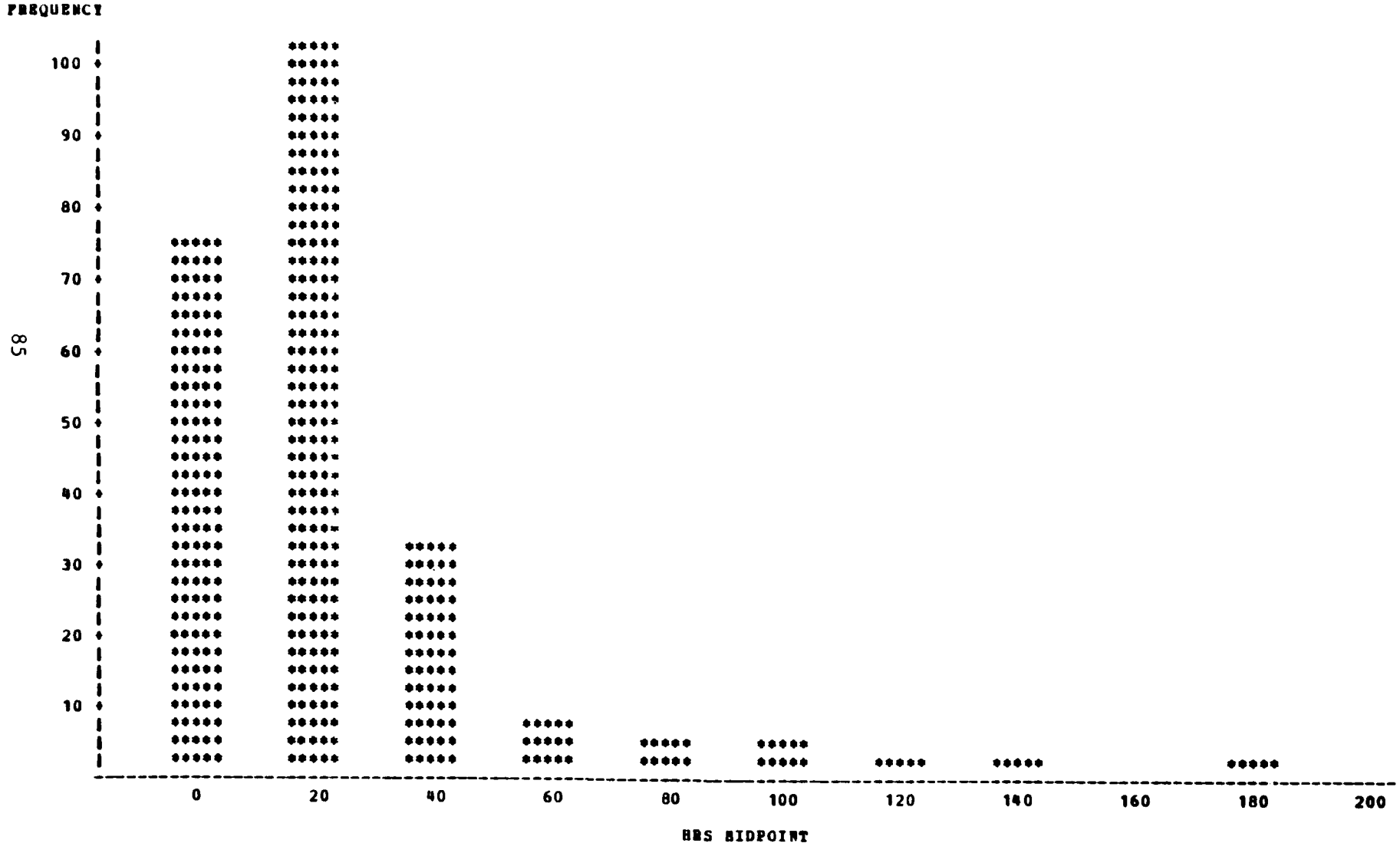
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=COMBAT TRACKED VEHICLE, AVDS 1790

FREQUENCY BAR CHART



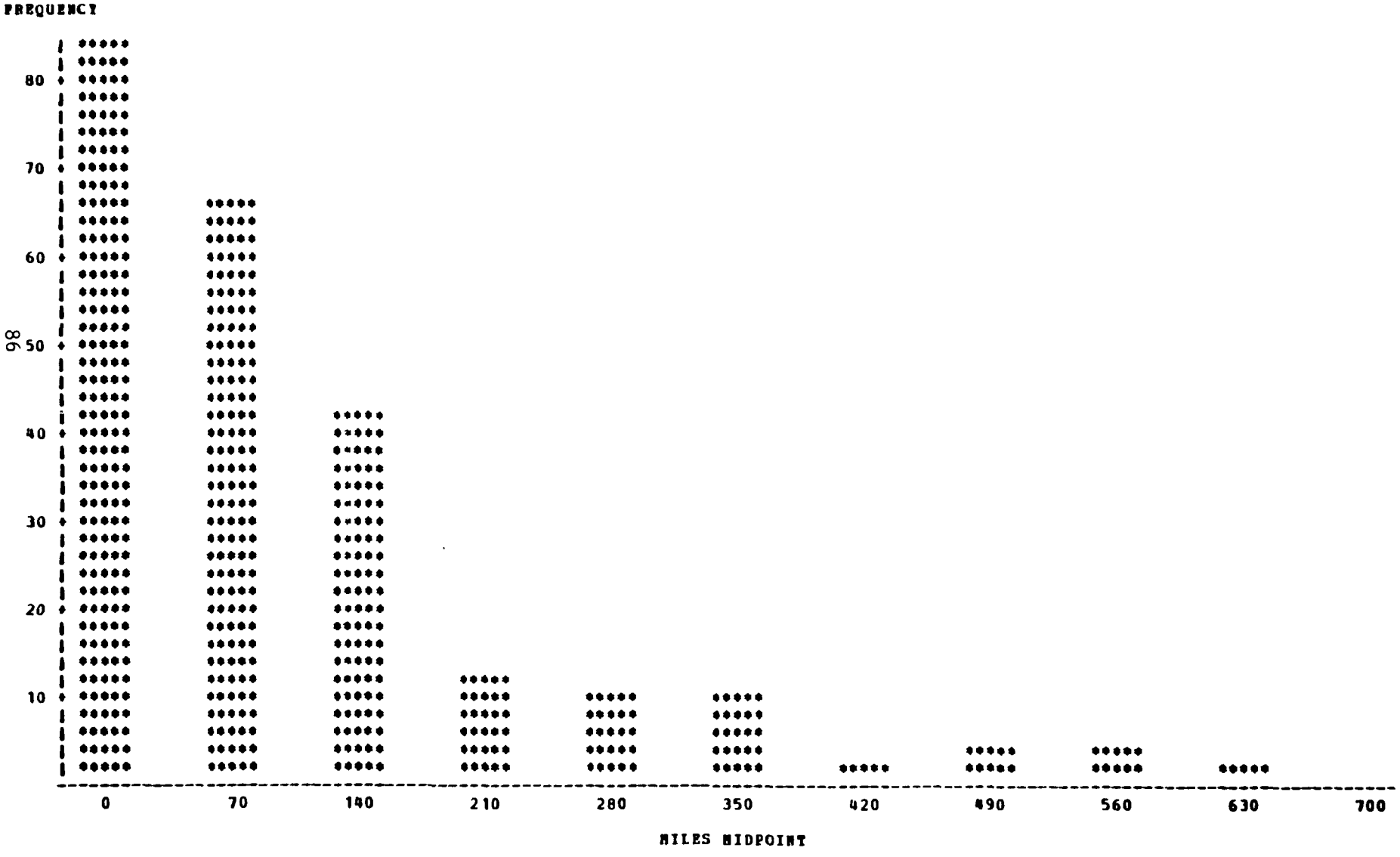
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=FIGHTING VEHICLE, VTA-903

FREQUENCY BAR CHART



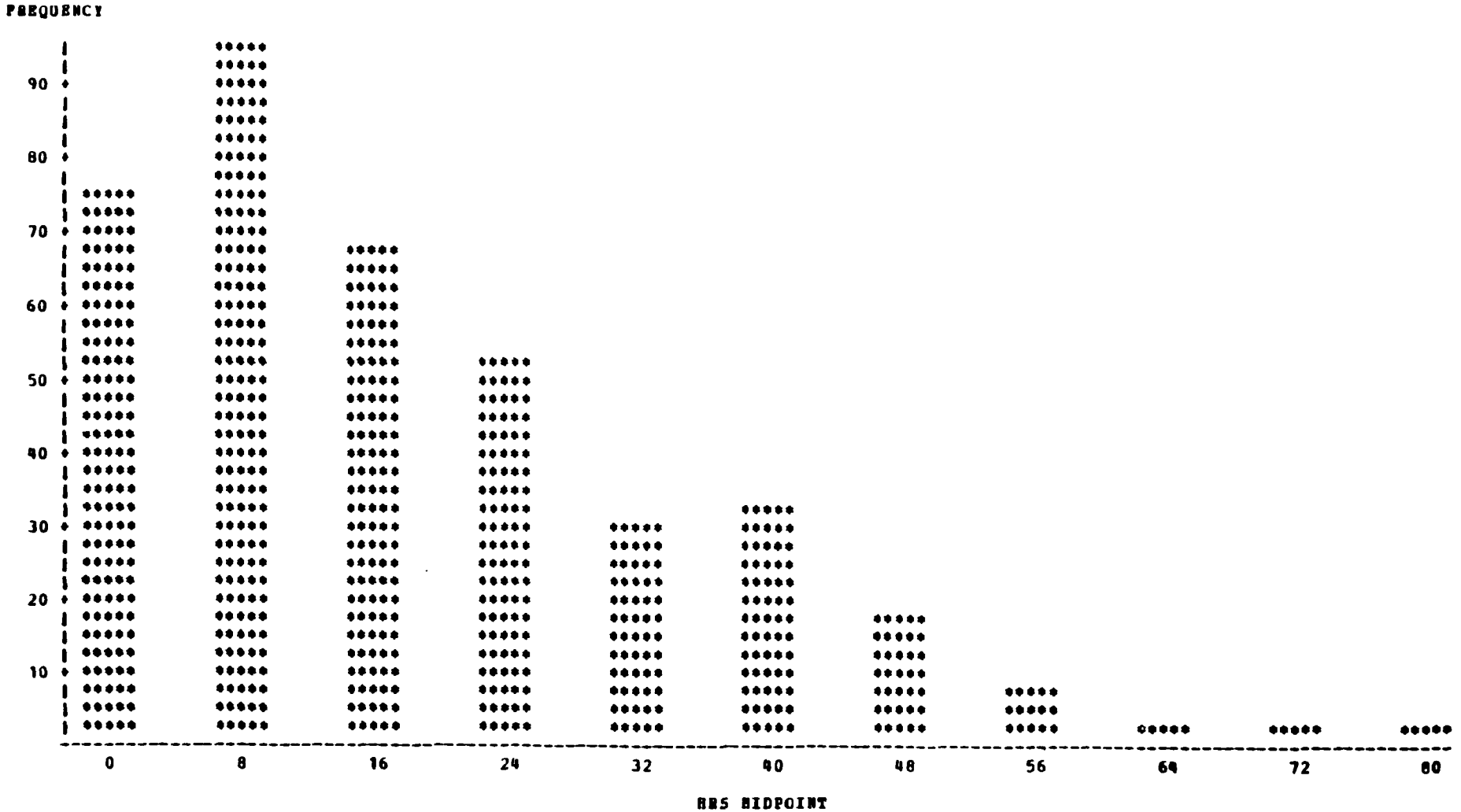
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=FIGHTING VEHICLE, VTA-903

FREQUENCY BAR CHART



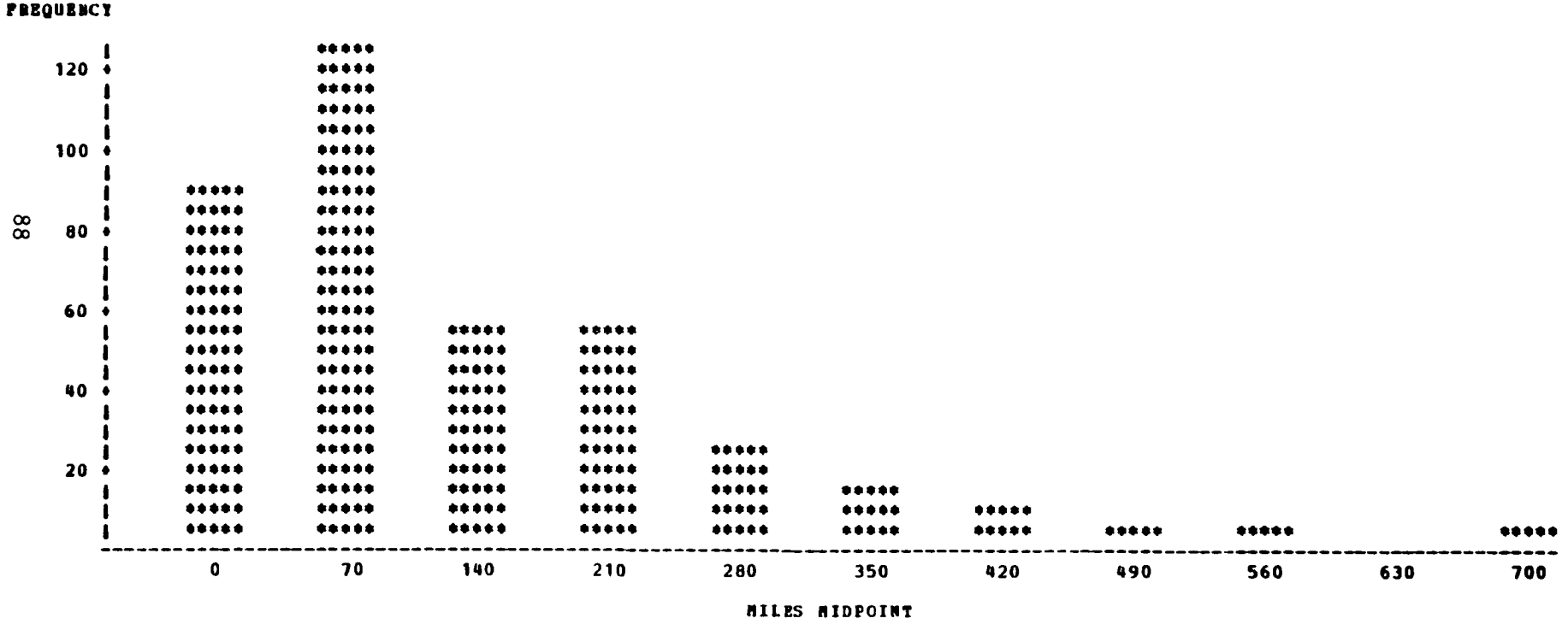
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=CARRIER TRACKED, 6V-53 AND 6V-53T

FREQUENCY BAR CHART



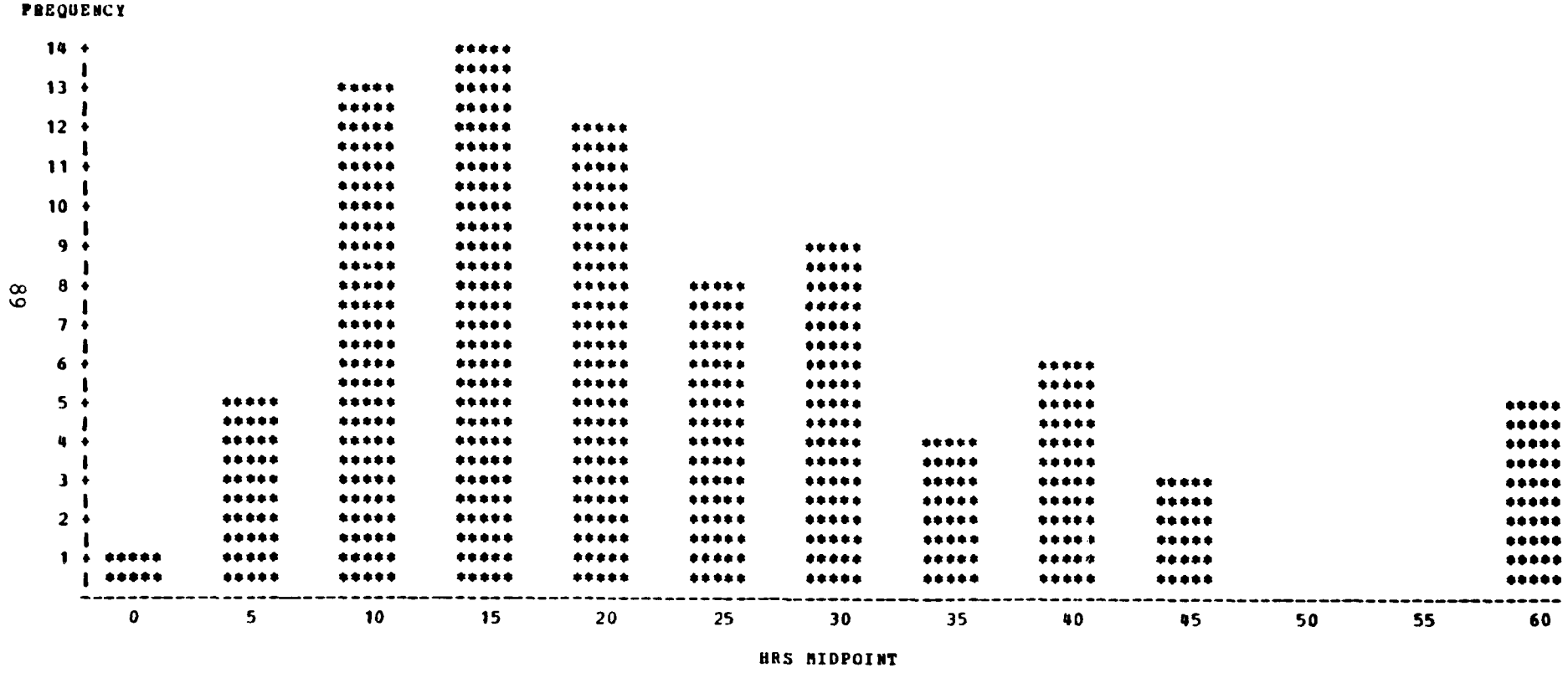
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=CARRIER TRACKED, 6V-53 AND 6V-53T

FREQUENCY BAR CHART



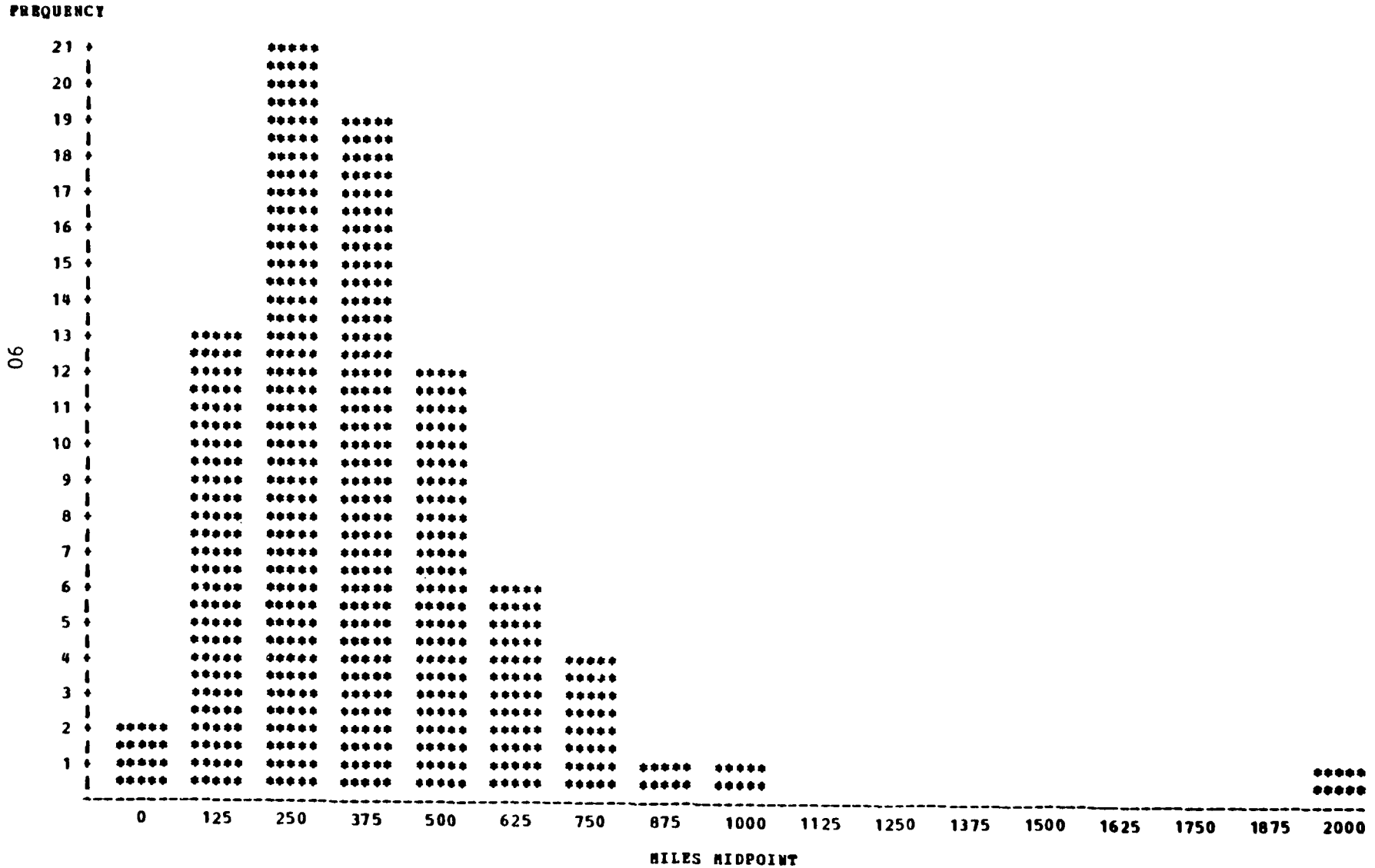
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 5 TON NHC250

FREQUENCY BAR CHART



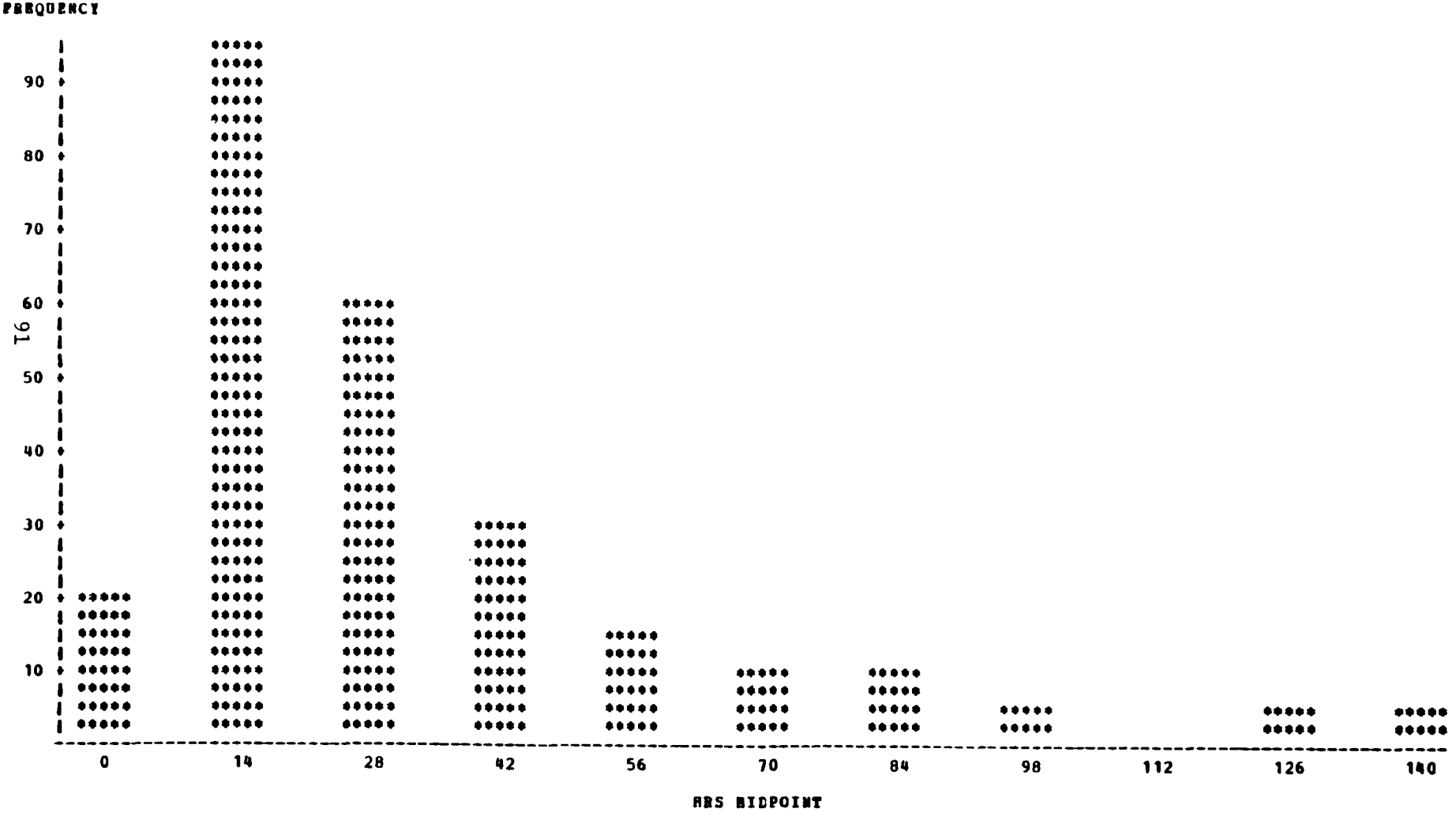
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 5 TON MHC250

FREQUENCY BAR CHART



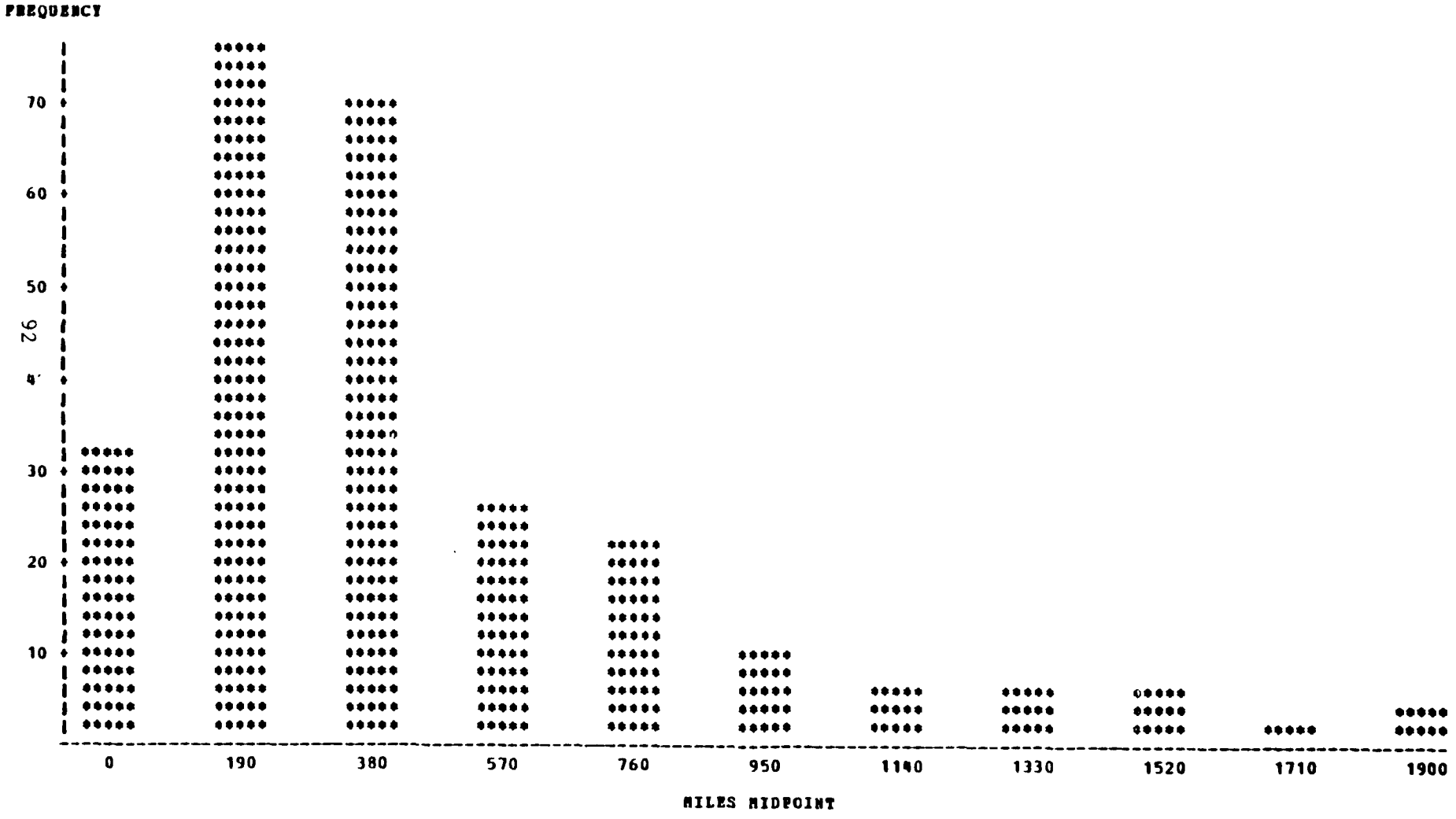
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 2 1/2 TON, LD465-1

FREQUENCY BAR CHART



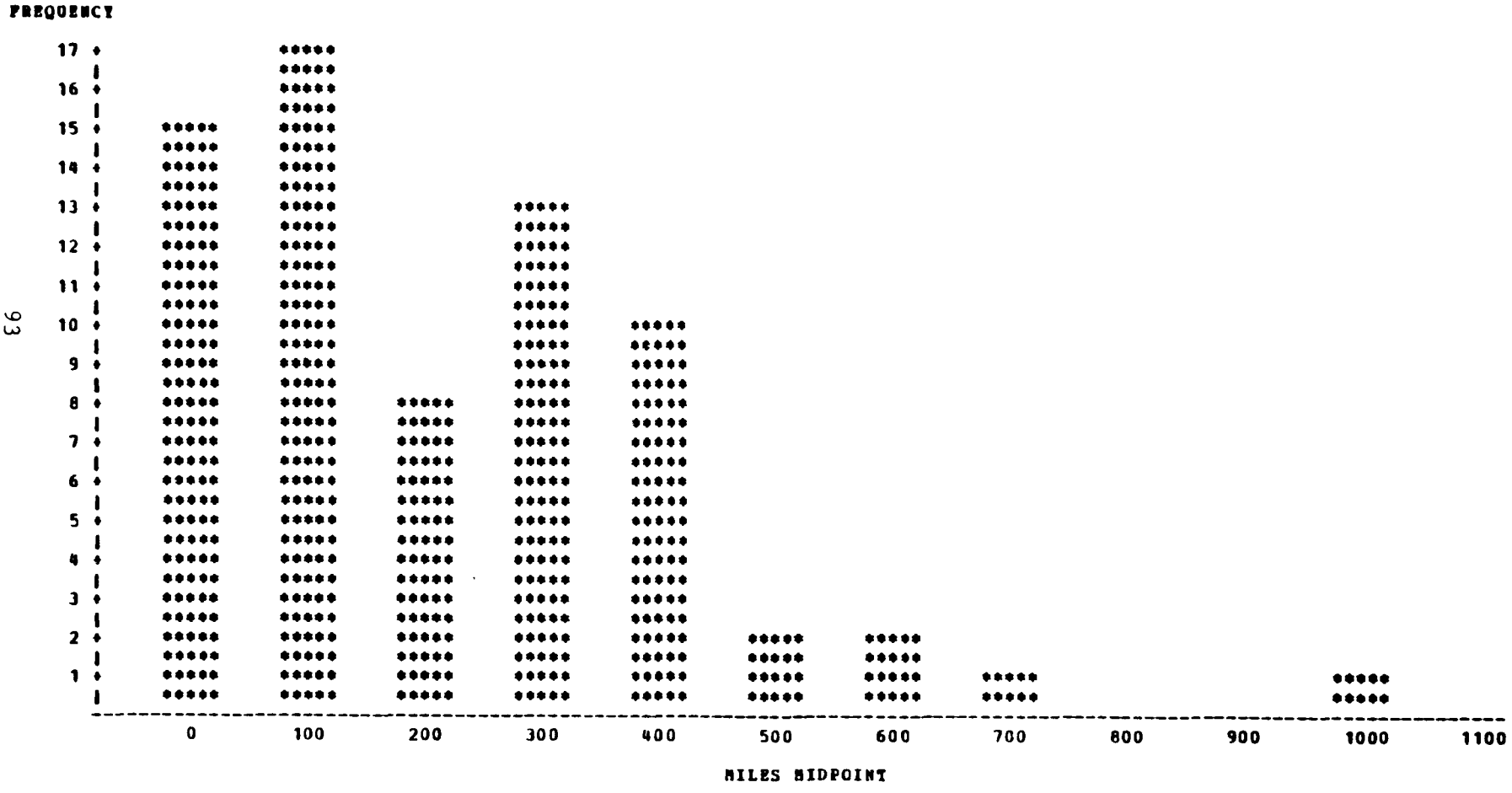
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 2 1/2 TON, LD465-1

FREQUENCY BAR CHART



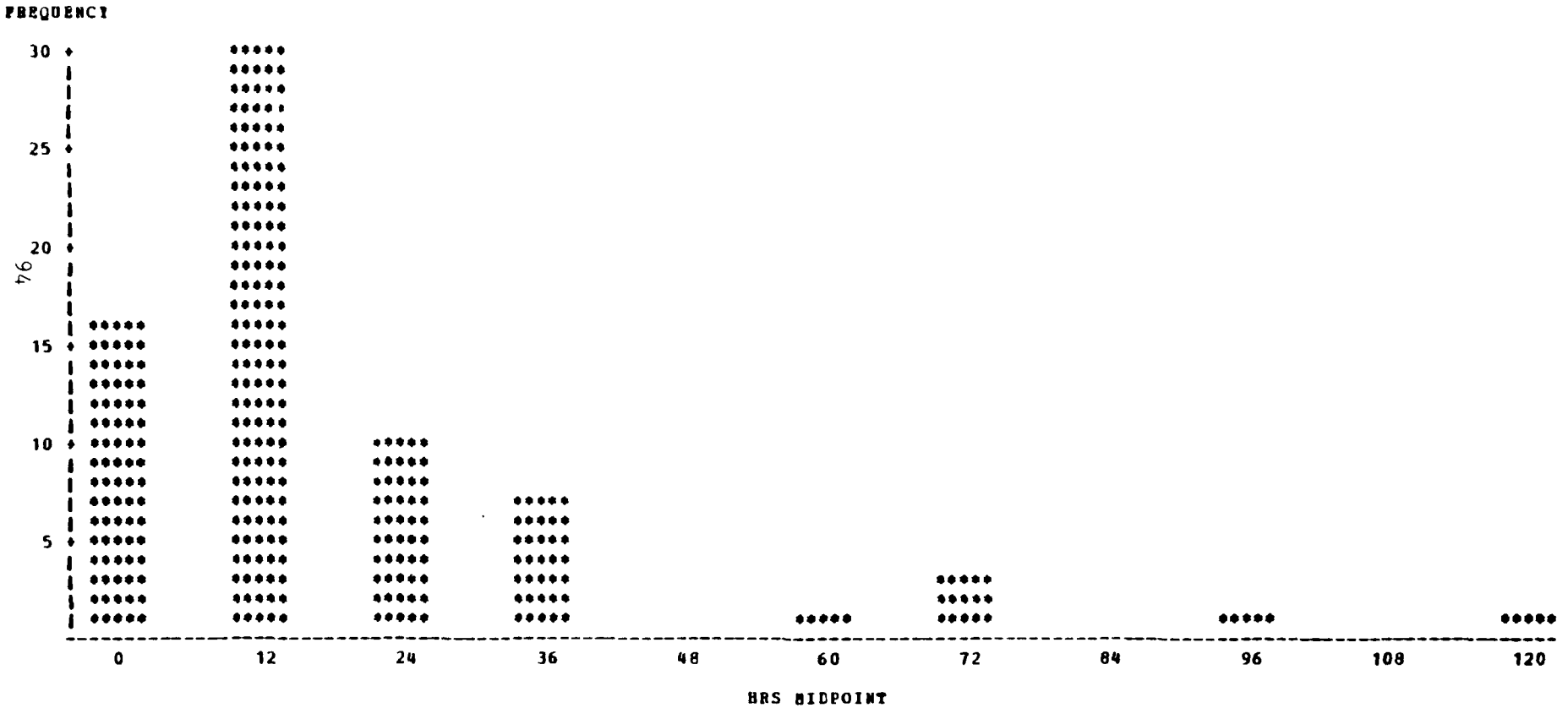
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 5 TON, LDS465-1

FREQUENCY BAR CHART



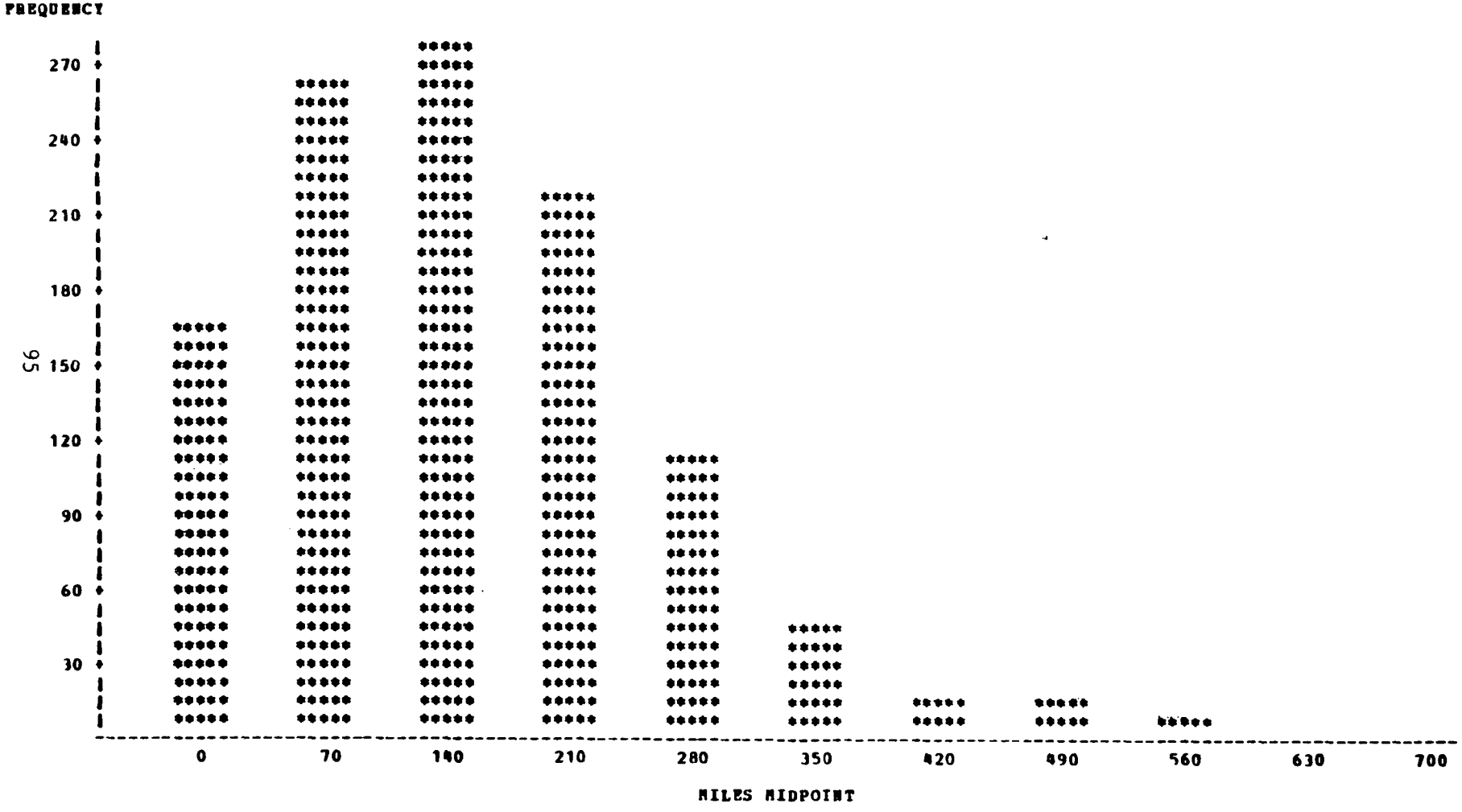
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 5 TON, LDS465-1

FREQUENCY BAR CHART



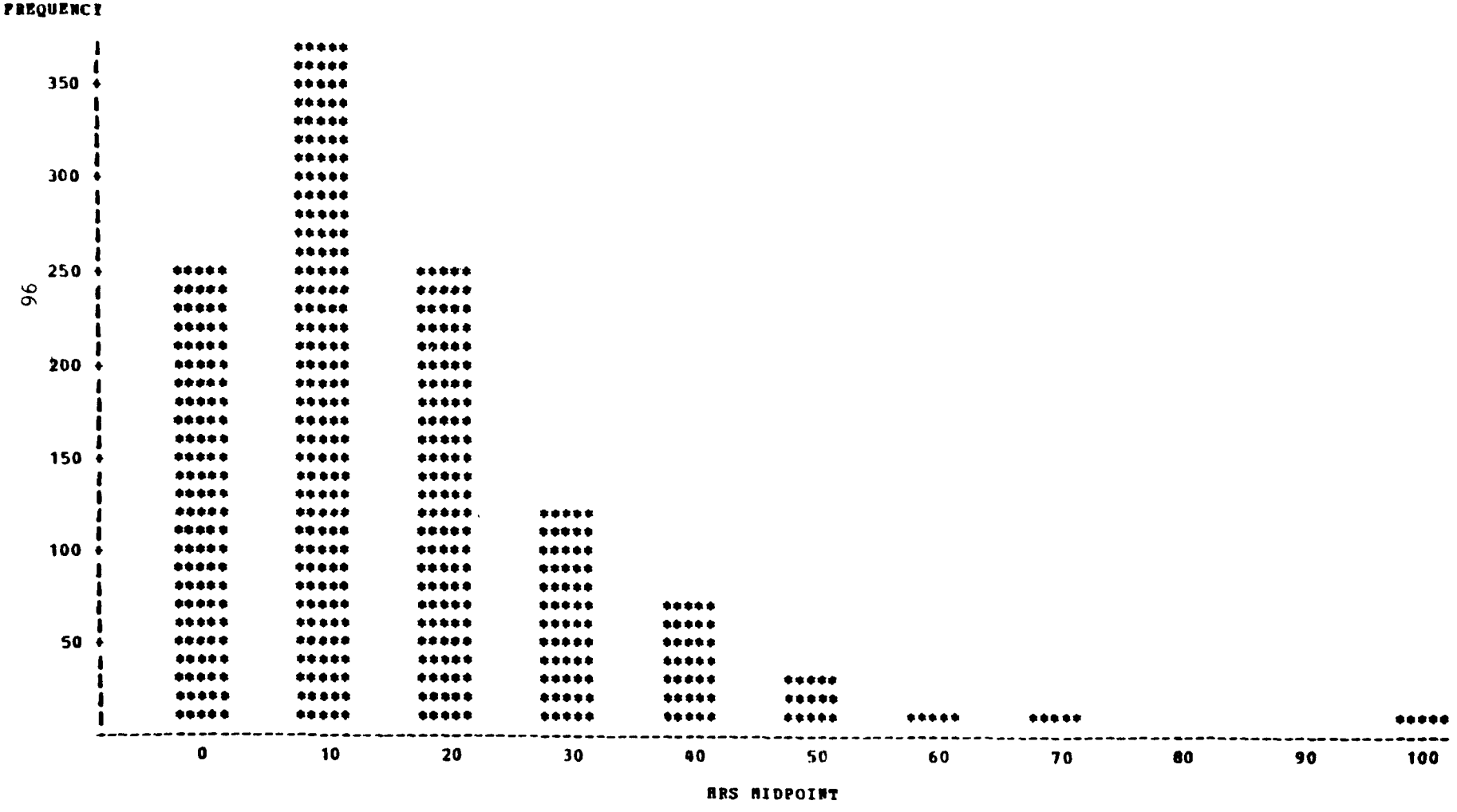
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=CARRIER TRACKED, 6V53

FREQUENCY BAR CHART



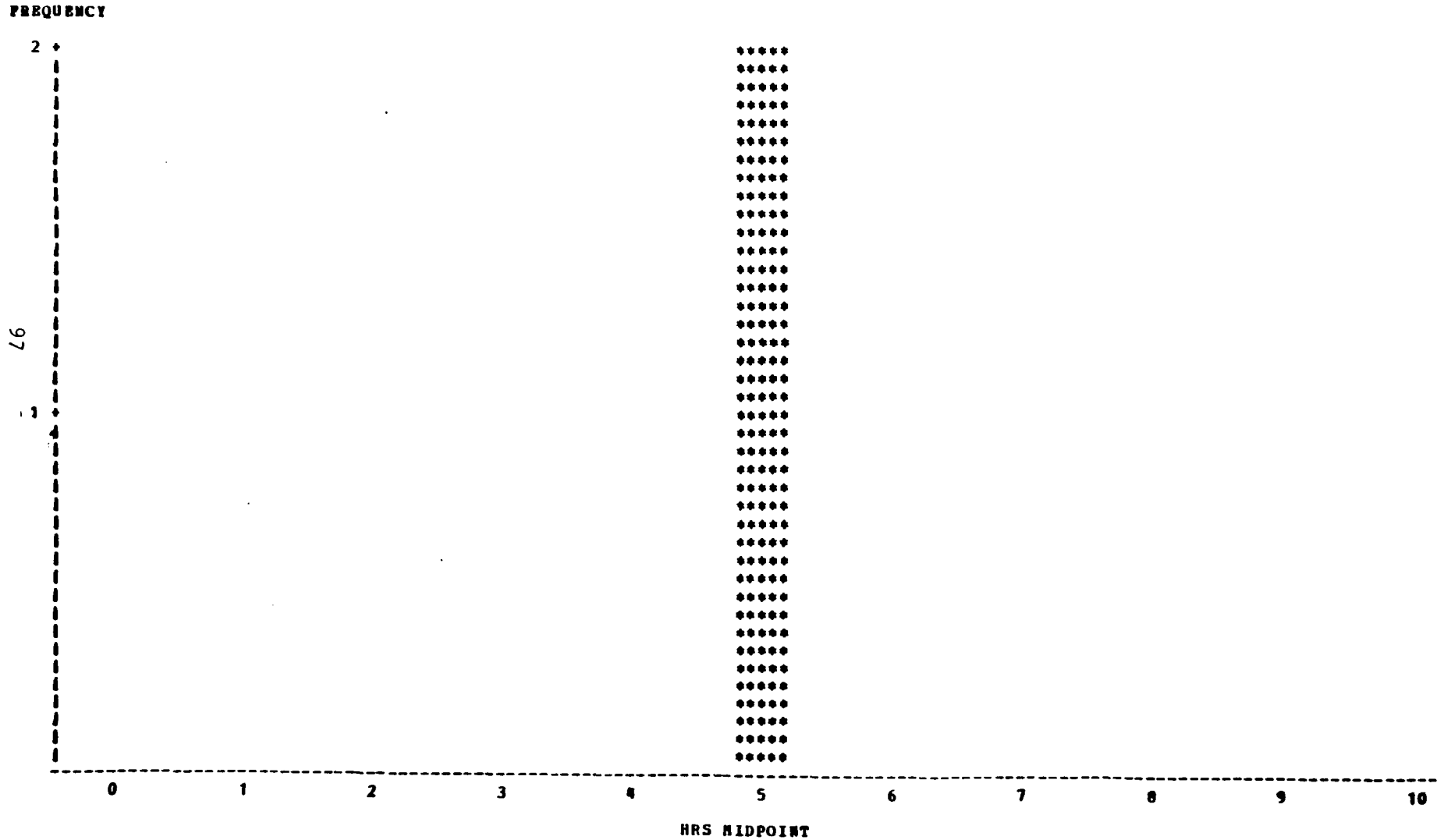
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=CARRIER TRACKED, 6V53

FREQUENCY BAR CHART



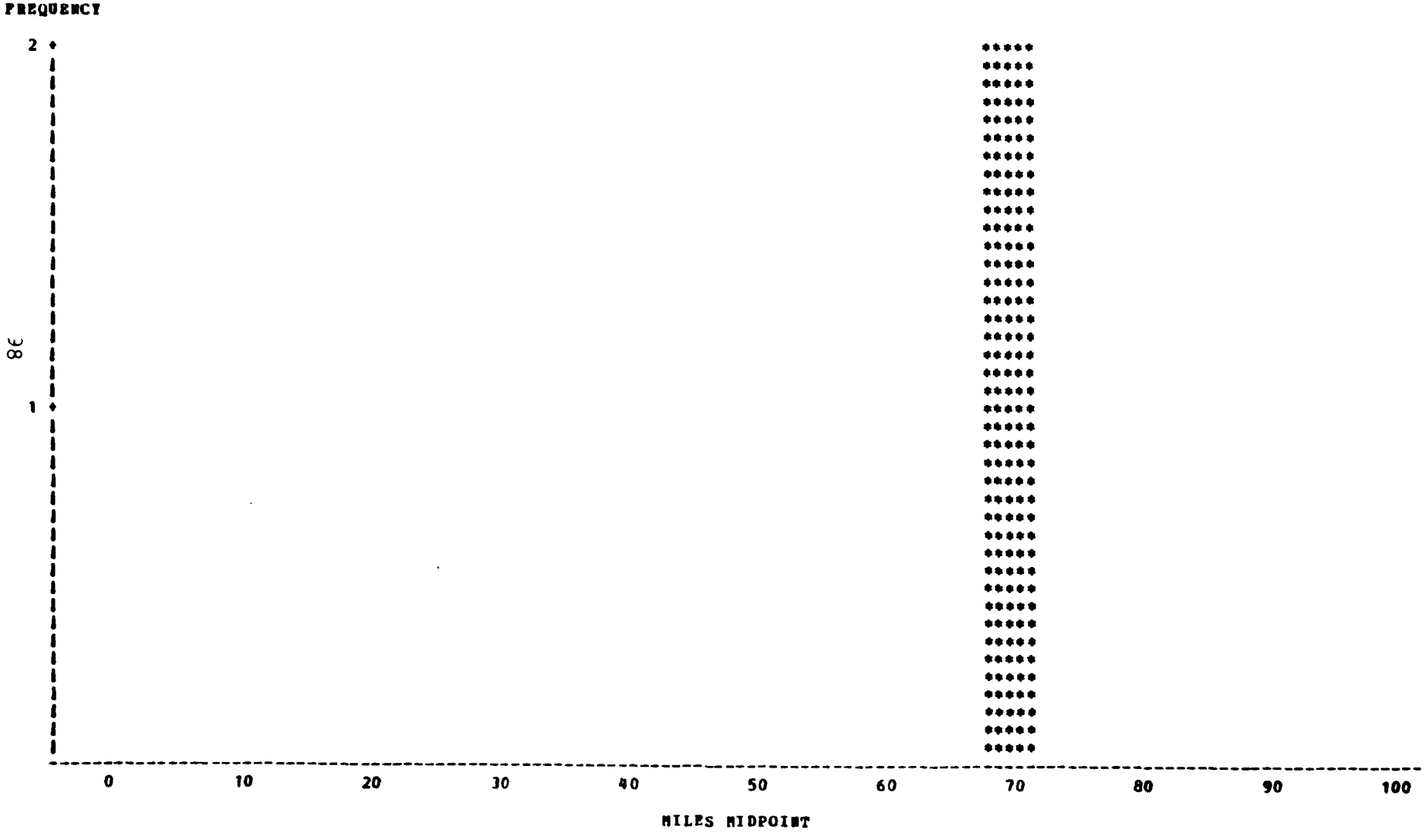
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK TACTICAL 1 1/4 TON, CHRYSLER 318

FREQUENCY BAR CHART



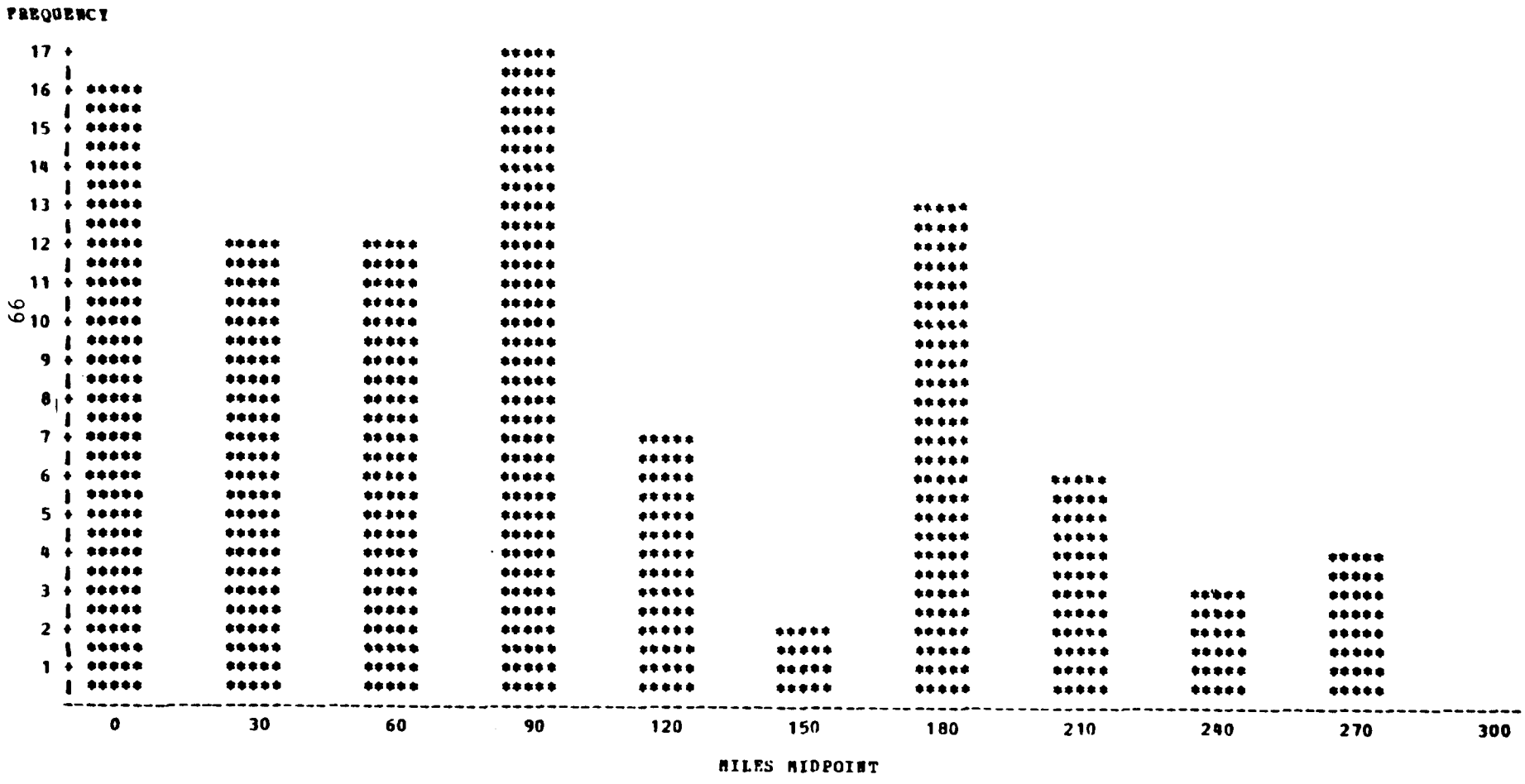
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK TACTICAL 1 1/4 TON, CHRYSLER 318

FREQUENCY BAR CHART



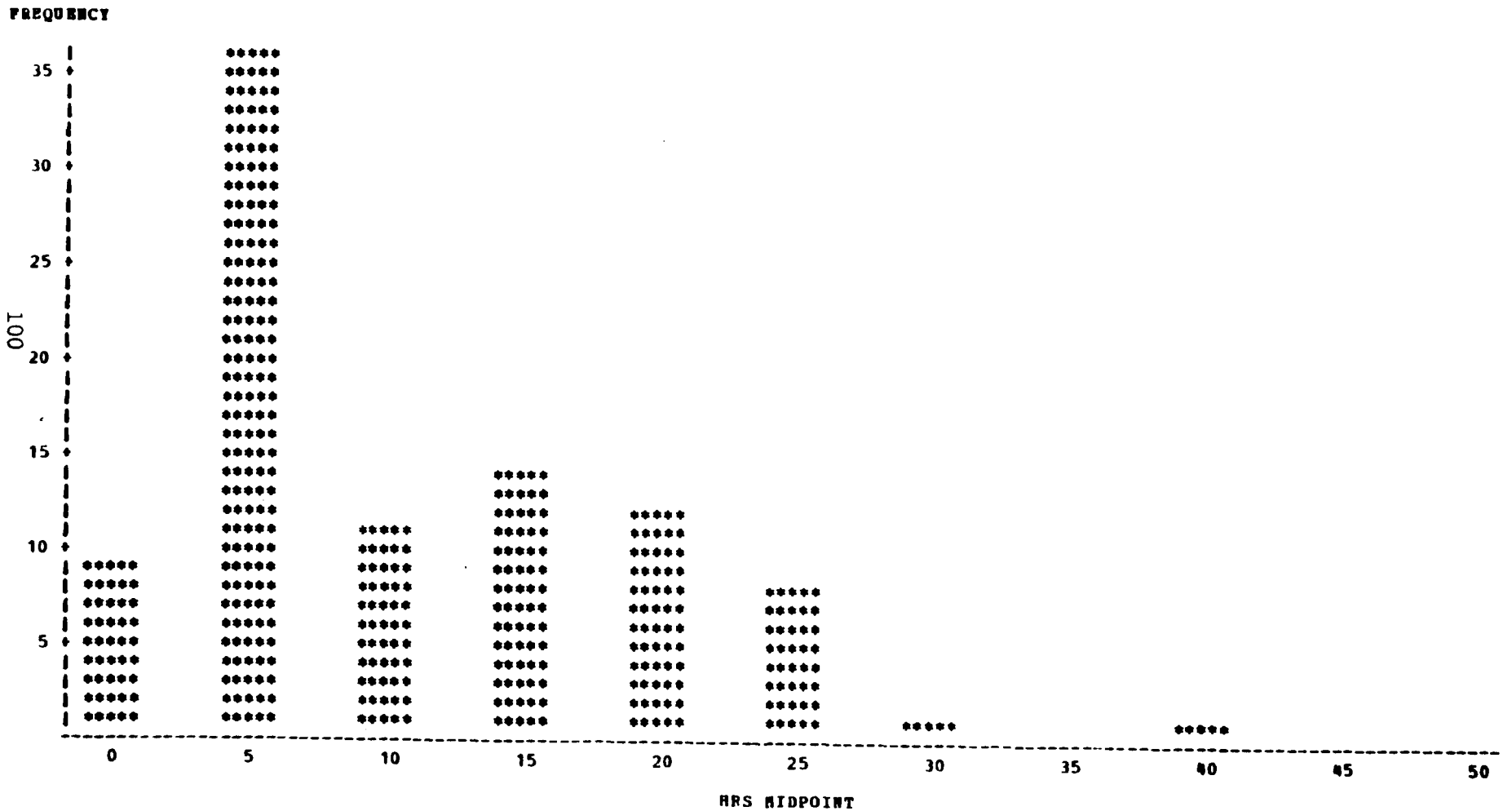
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=COMBAT TRACKED VEHICLE, 8V71T

FREQUENCY BAR CHART



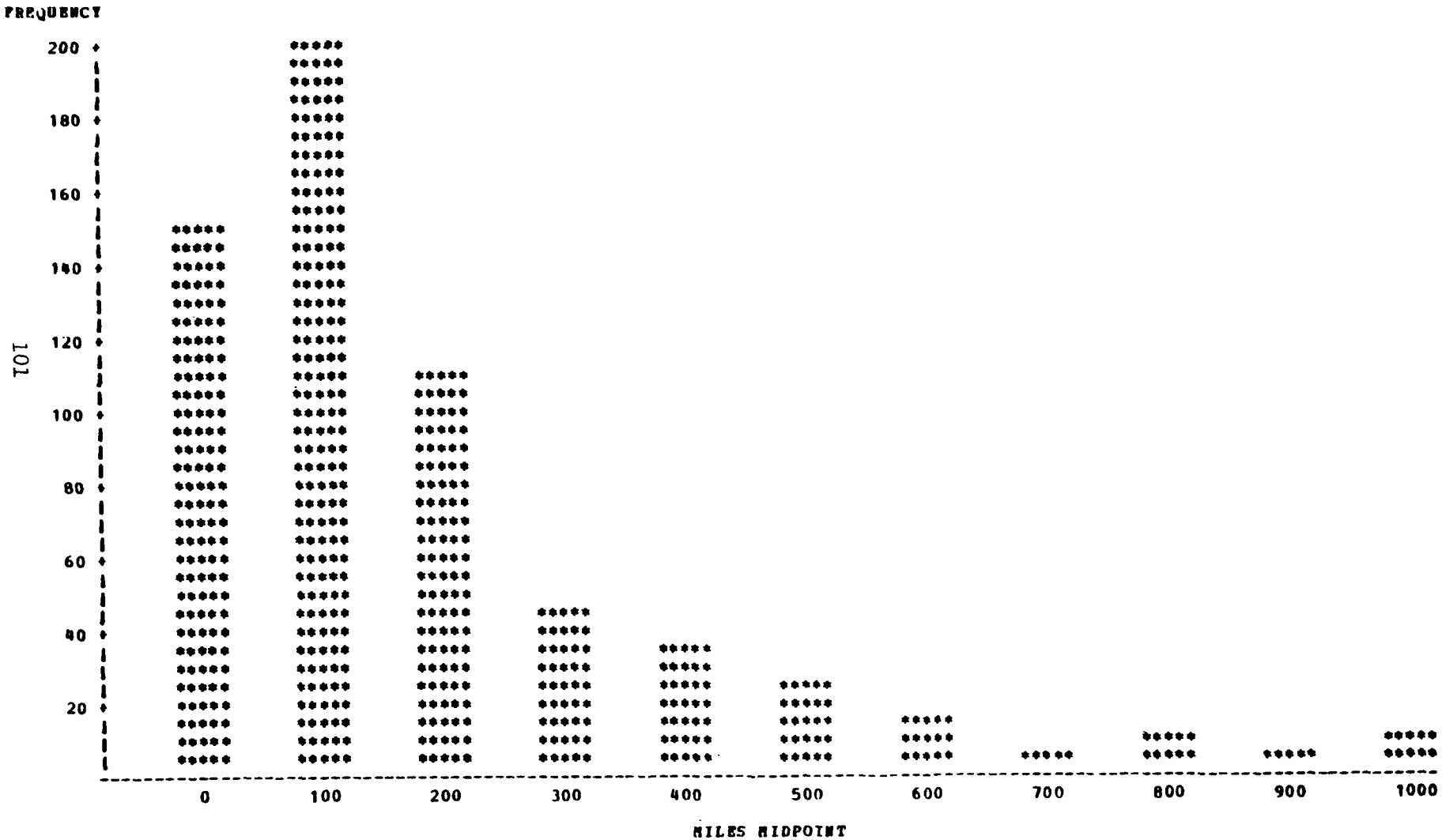
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=COMBAT TRACKED VEHICLE, AV71T

FREQUENCY BAR CHART



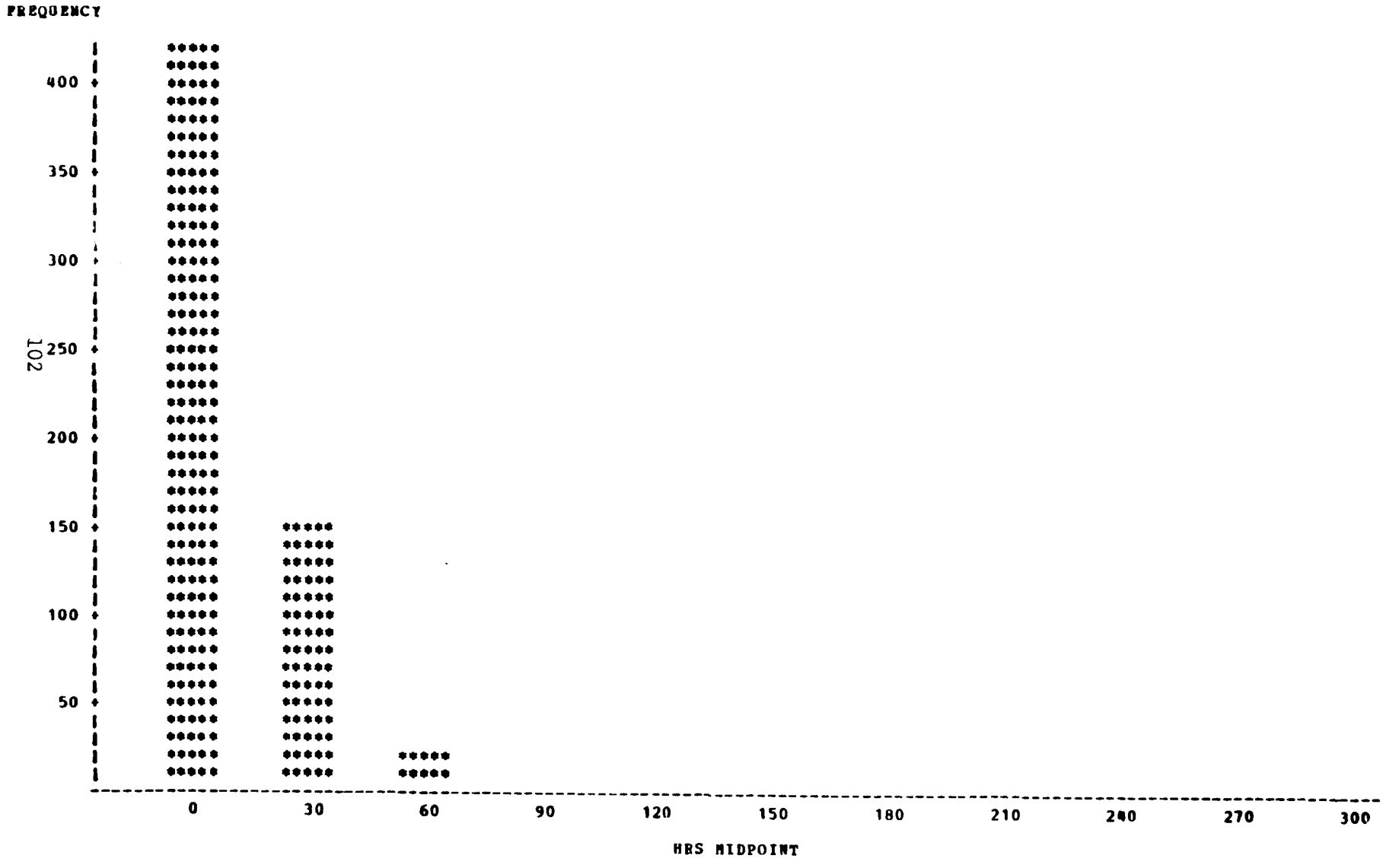
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR PT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 2 1/2 TON, LD465-1

FREQUENCY BAR CHART



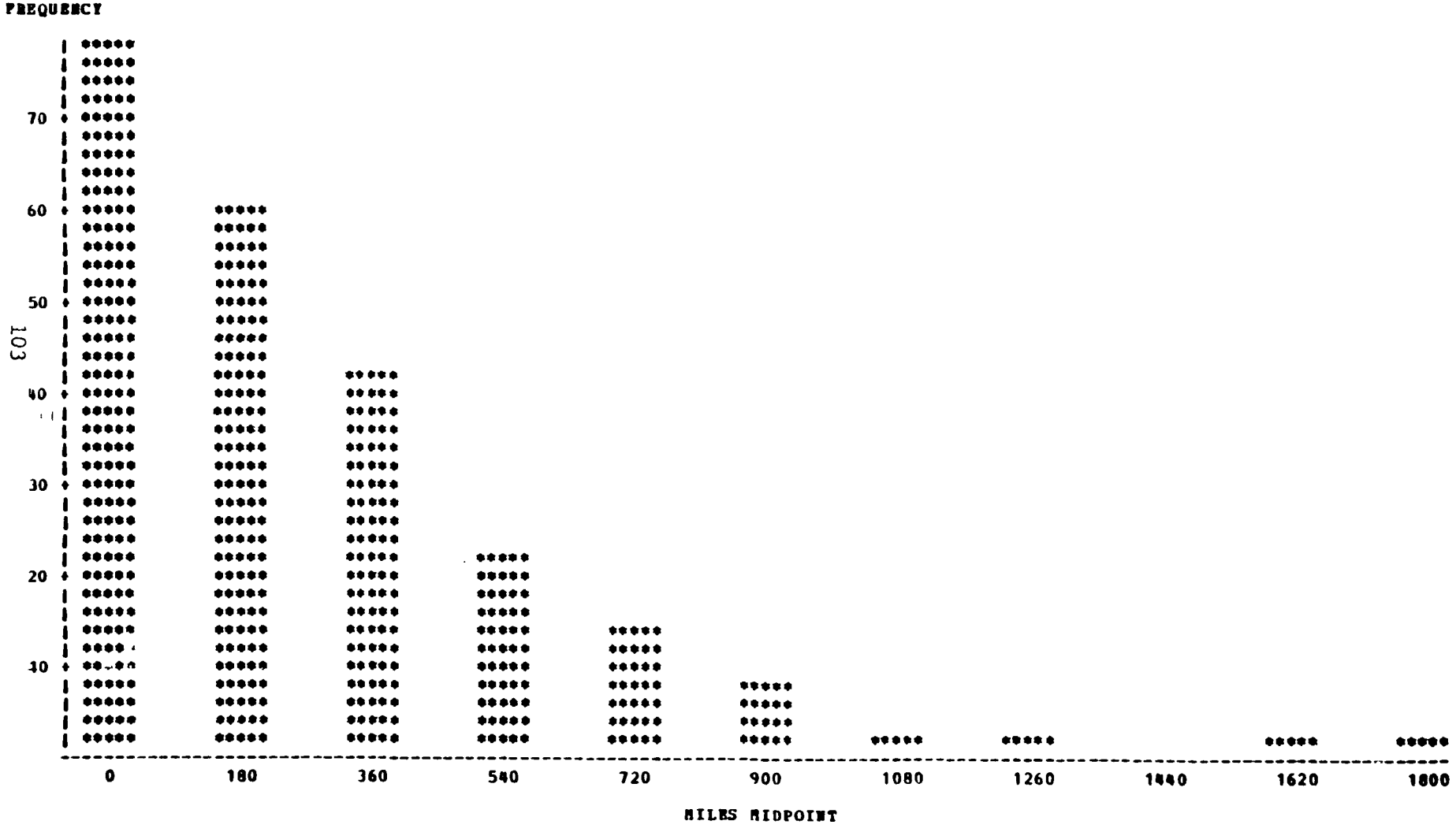
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 2 1/2 TON, LD465-1

FREQUENCY BAR CHART



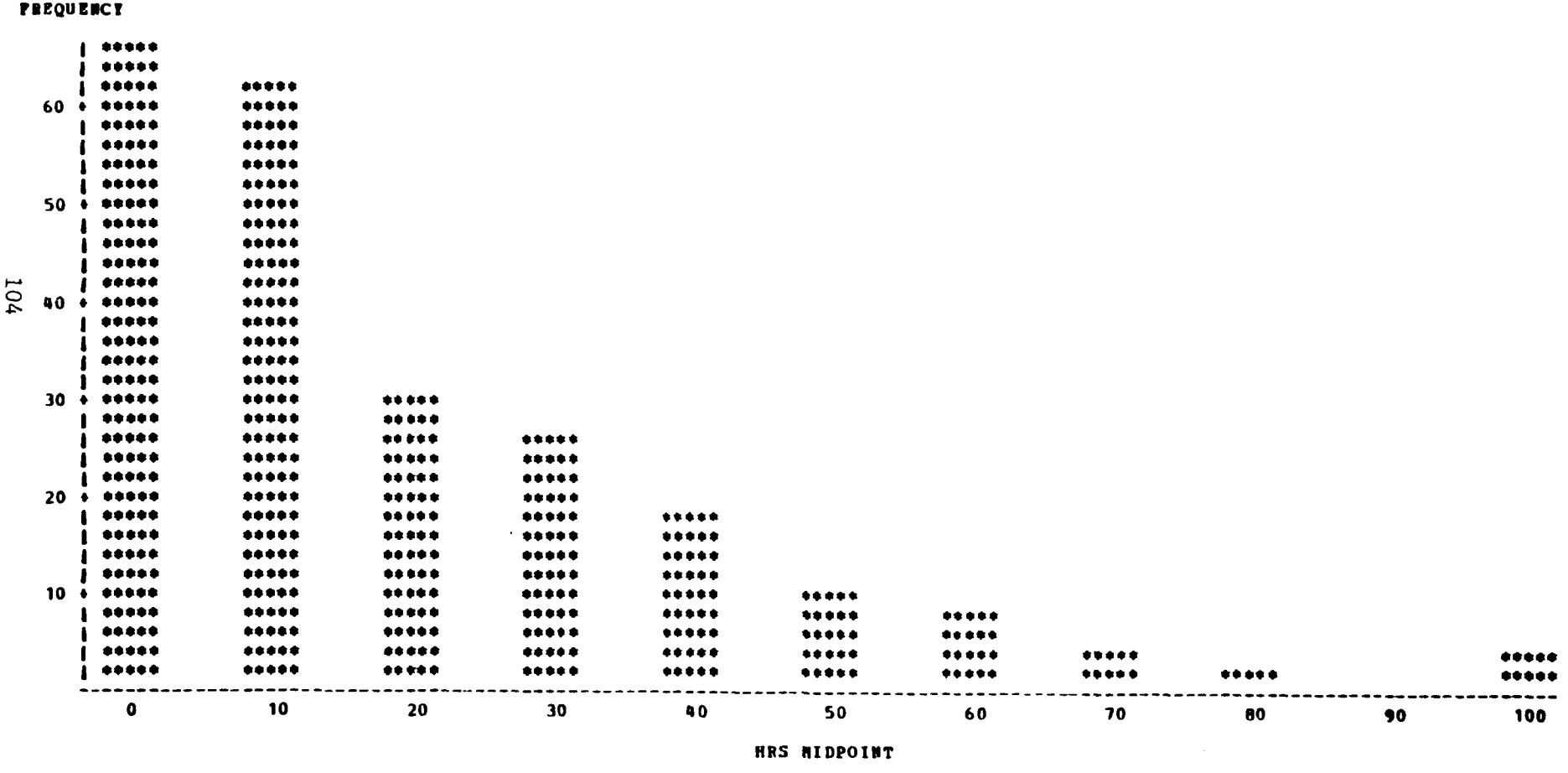
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3BD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 5 TON, LDS465-1

FREQUENCY BAR CHART



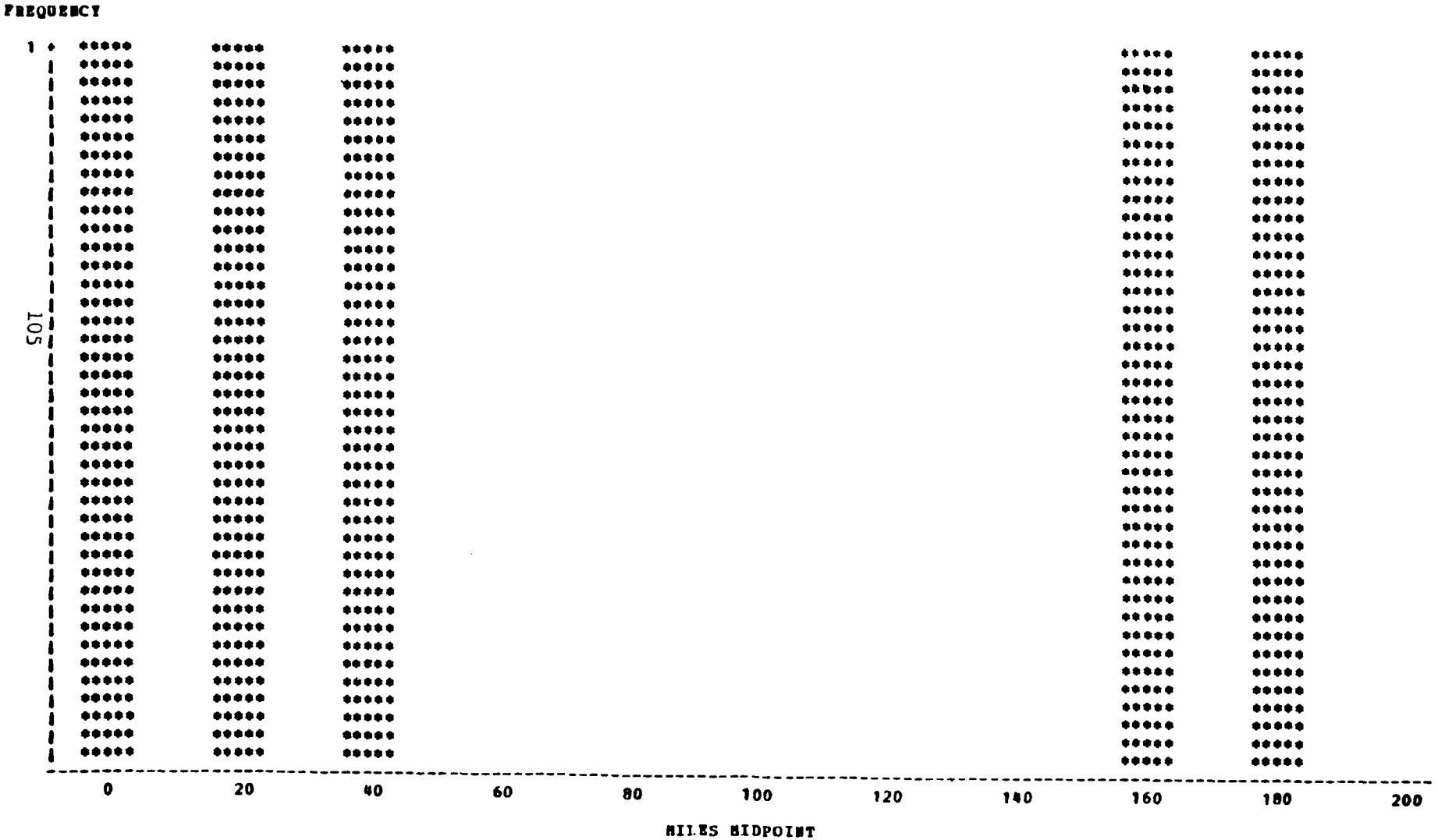
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 5 TON, LDS465-1

FREQUENCY BAR CHART



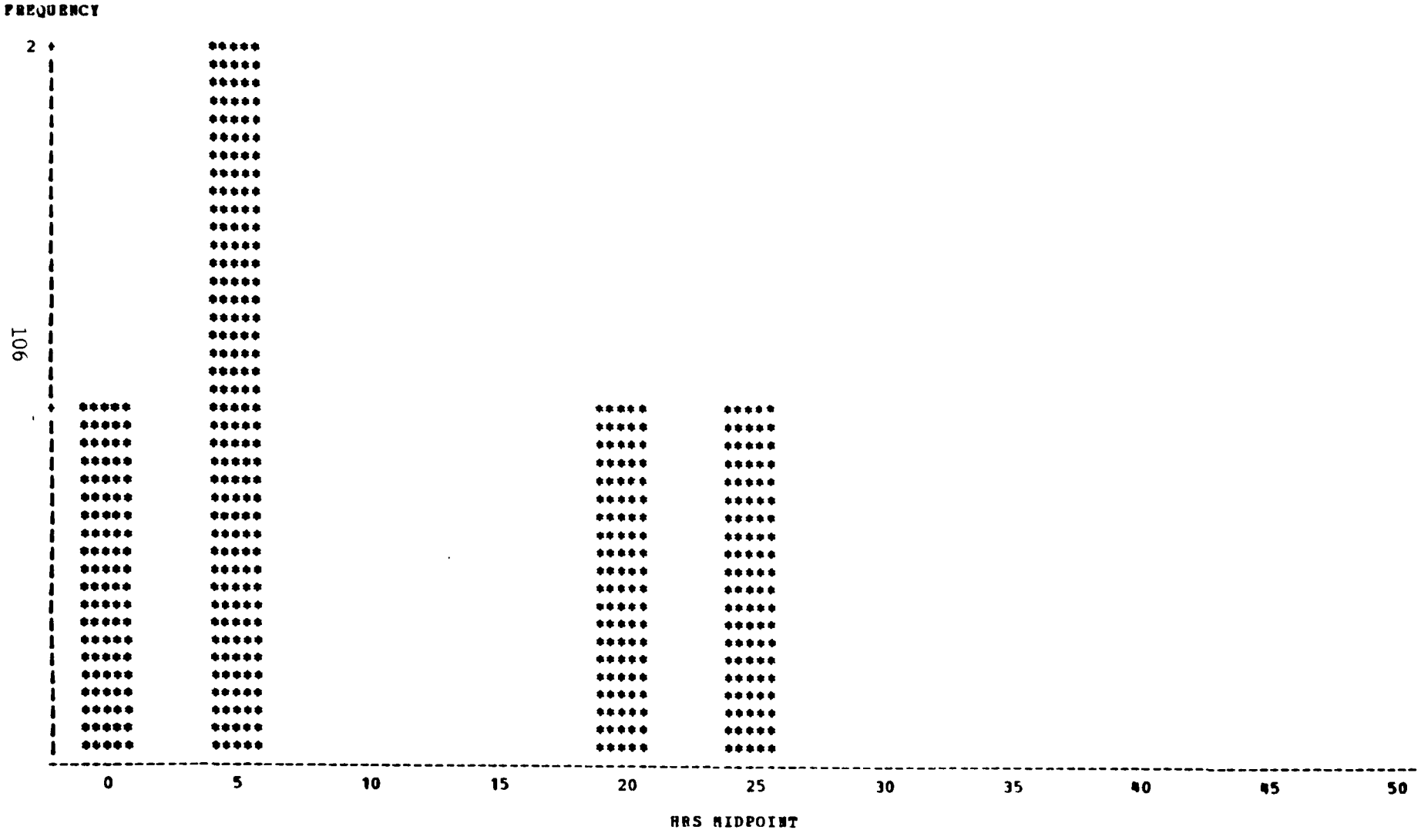
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 10 TON, V8-300

FREQUENCY BAR CHART



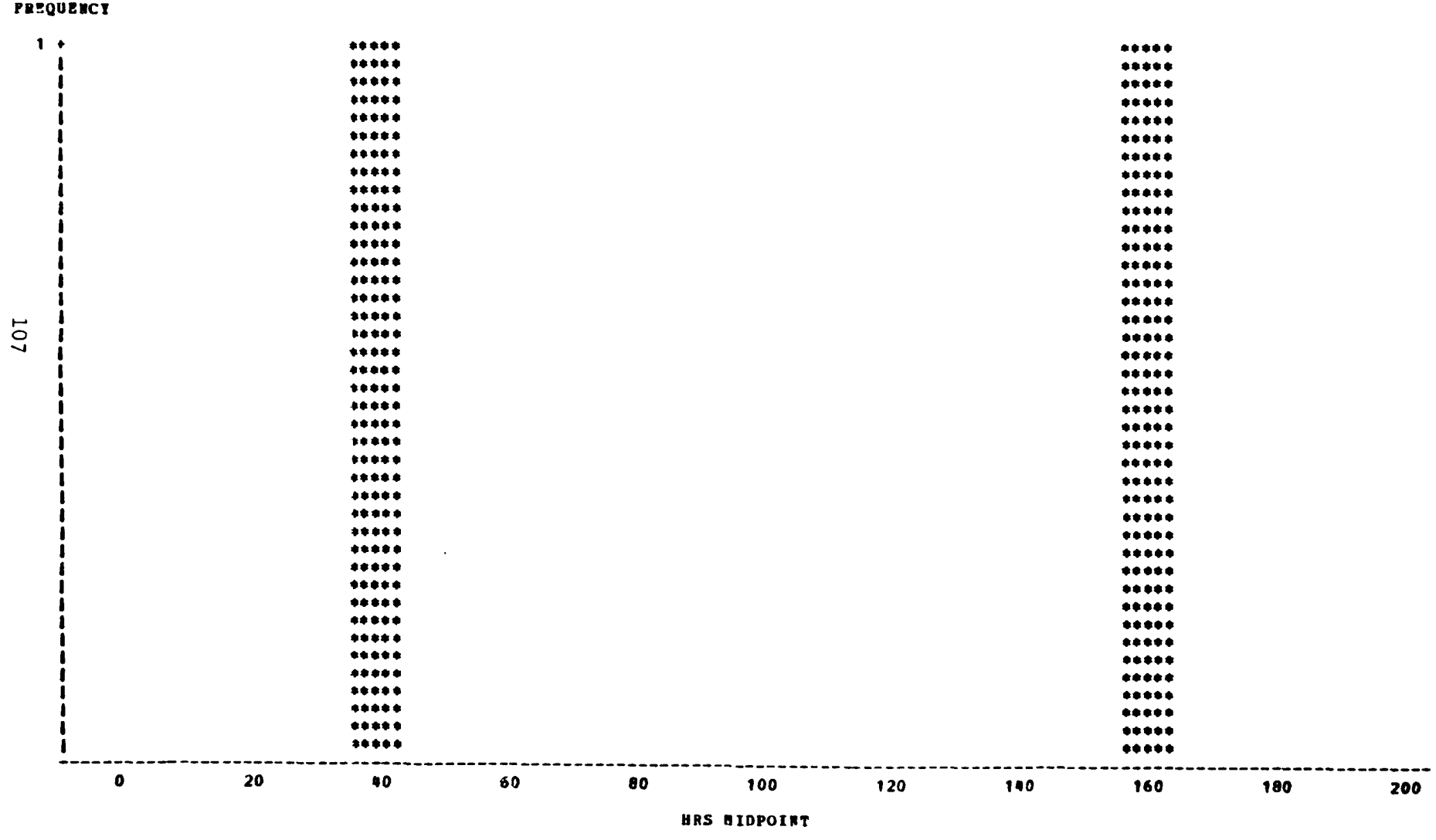
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 10 TON, V8-300

FREQUENCY BAR CHART



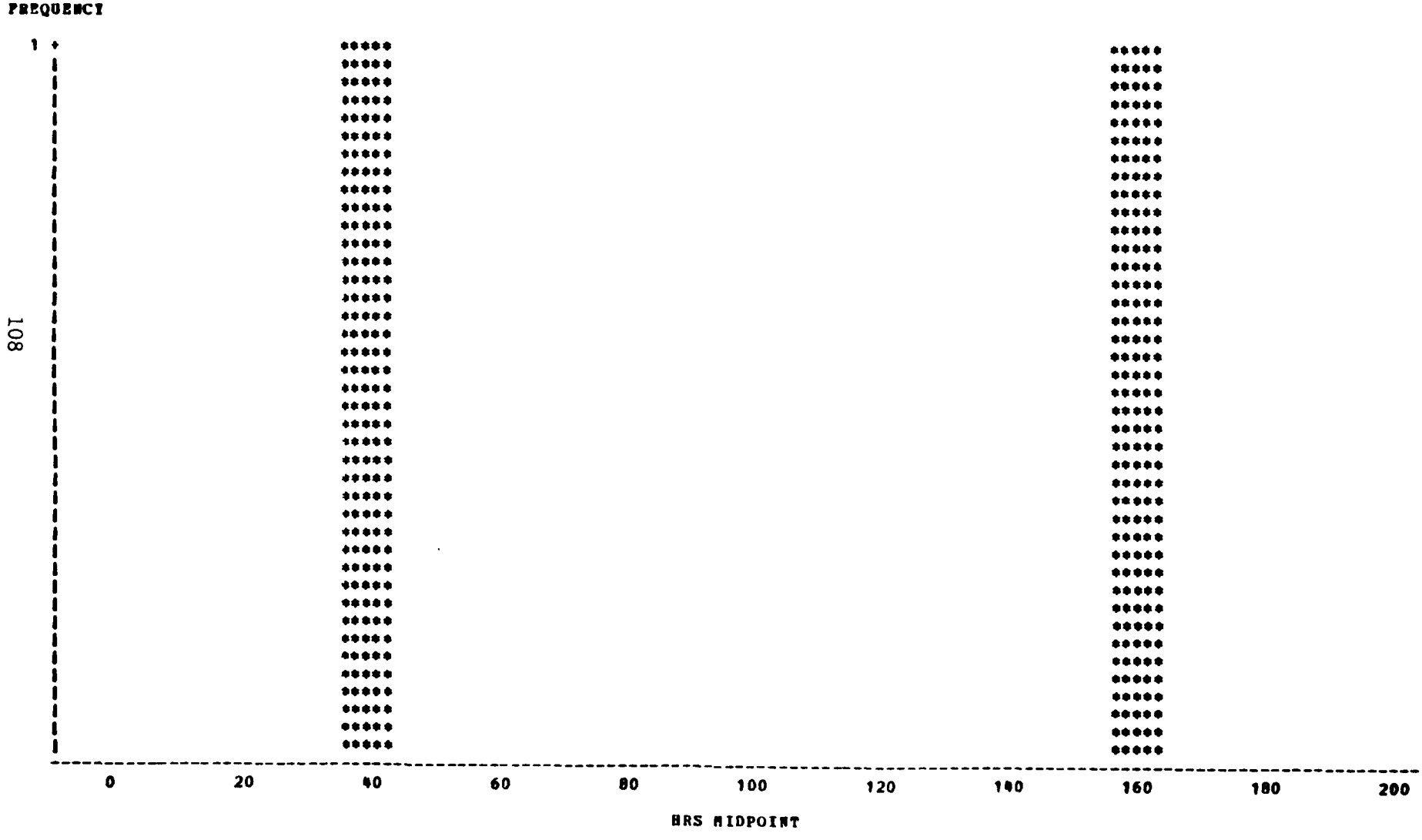
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK TACTICAL 1 1/4 TON, DD-353

FREQUENCY BAR CHART



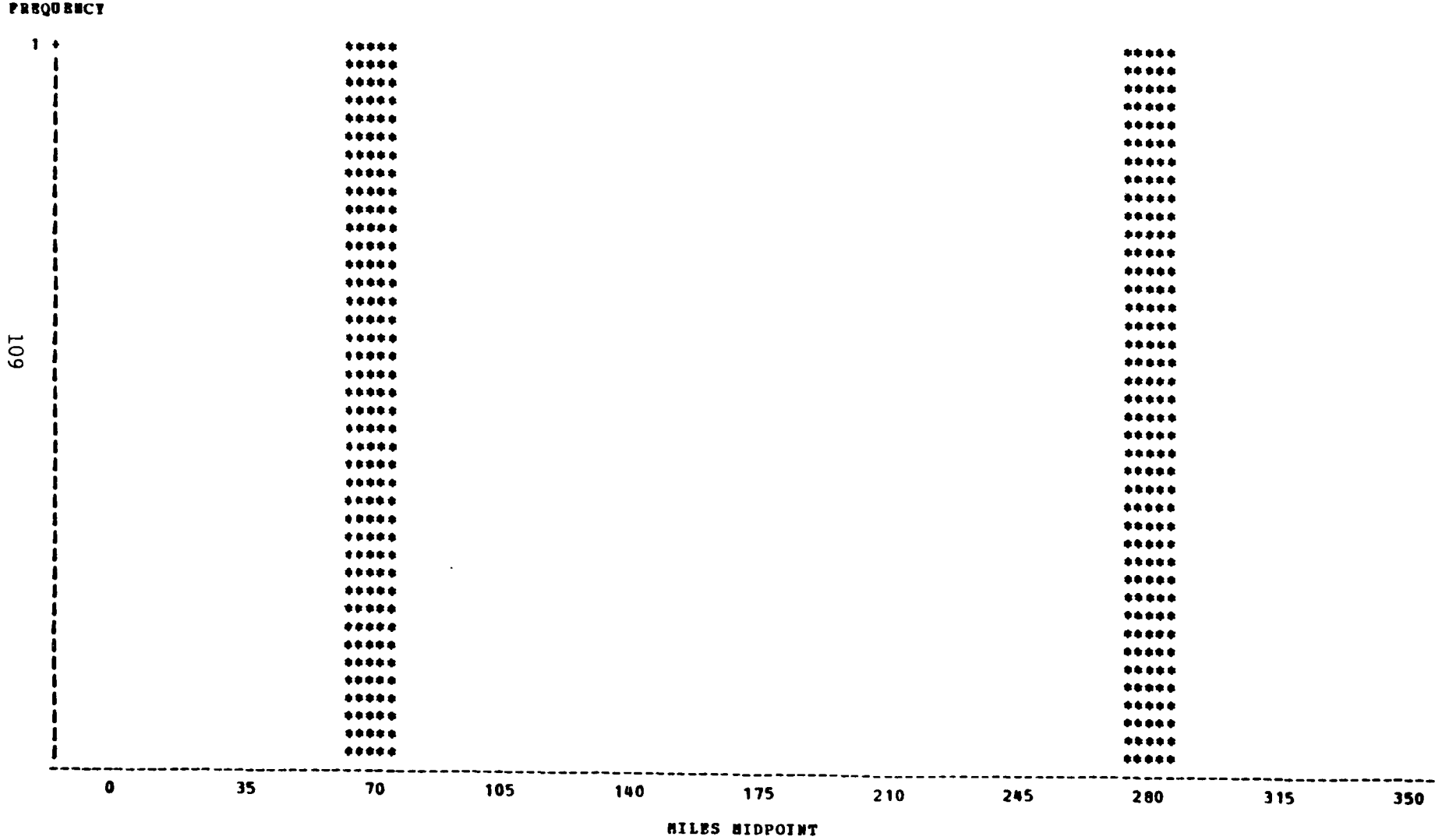
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK TACTICAL 1 1/4 TON, DD-353

FREQUENCY BAR CHART



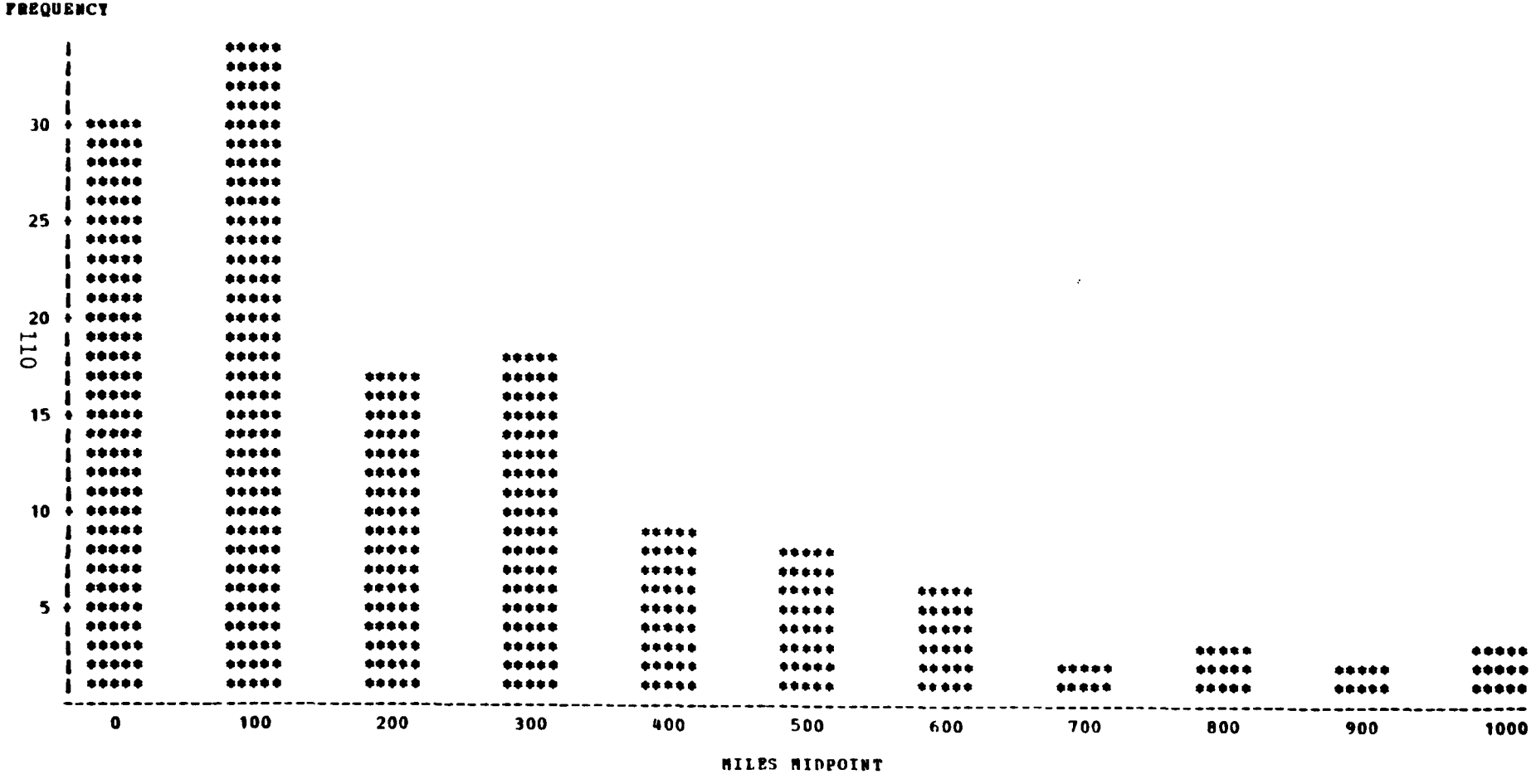
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK TACTICAL 1 1/4 TON, DD-353

FREQUENCY BAR CHART



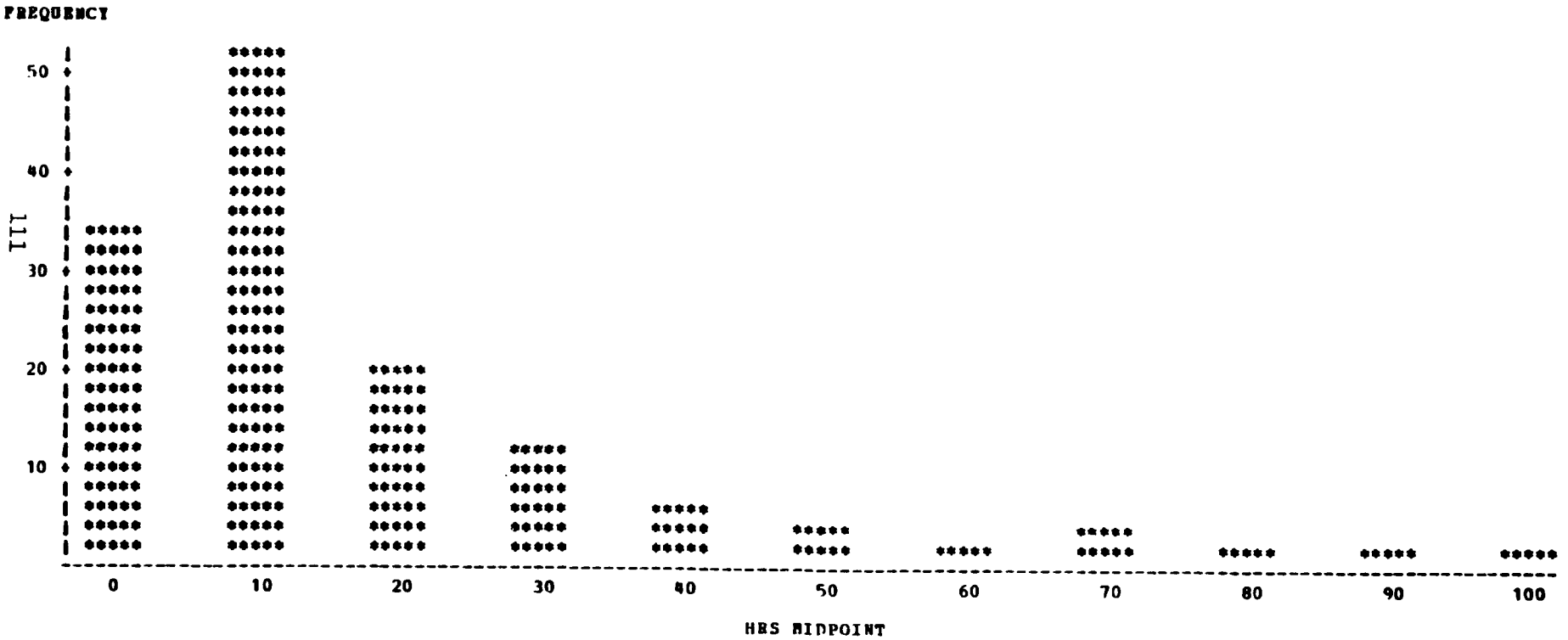
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=TRUCK 5 TON, NHC250

FREQUENCY BAR CHART



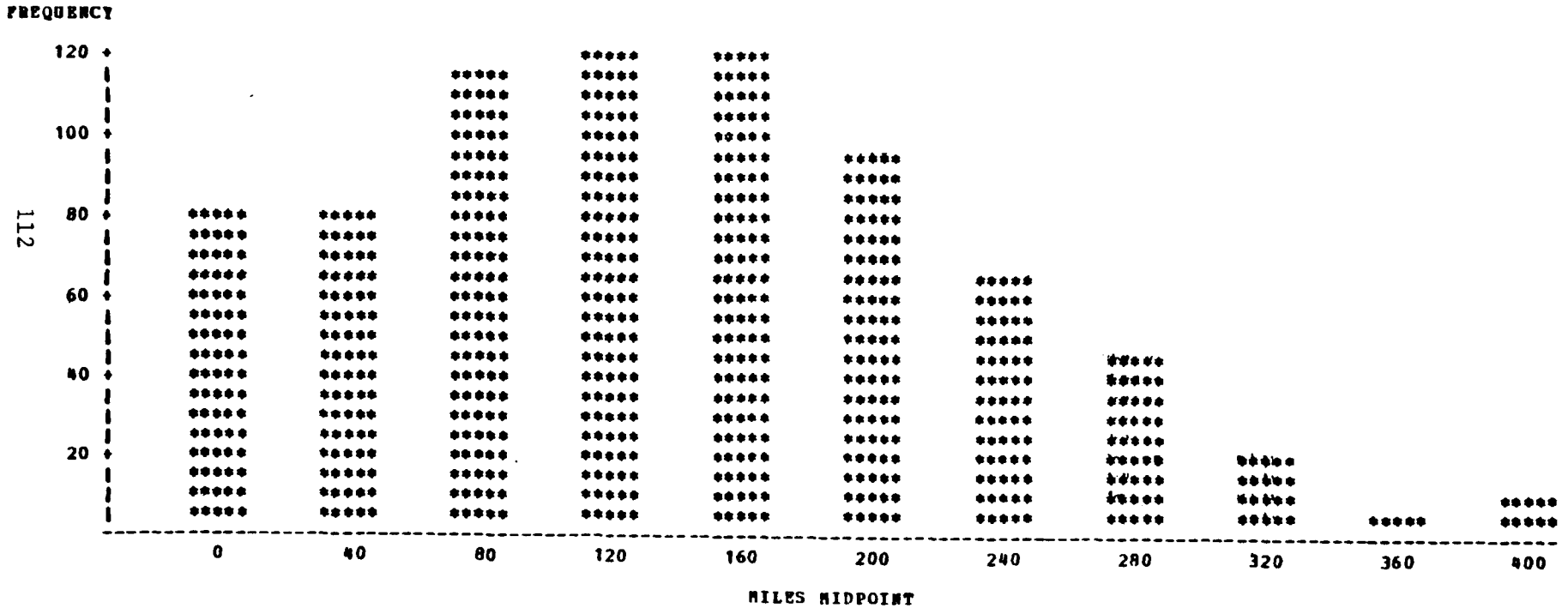
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILPS AND HOURS
ENGINE=TRUCK 5 TON, MHC250

FREQUENCY BAR CHART



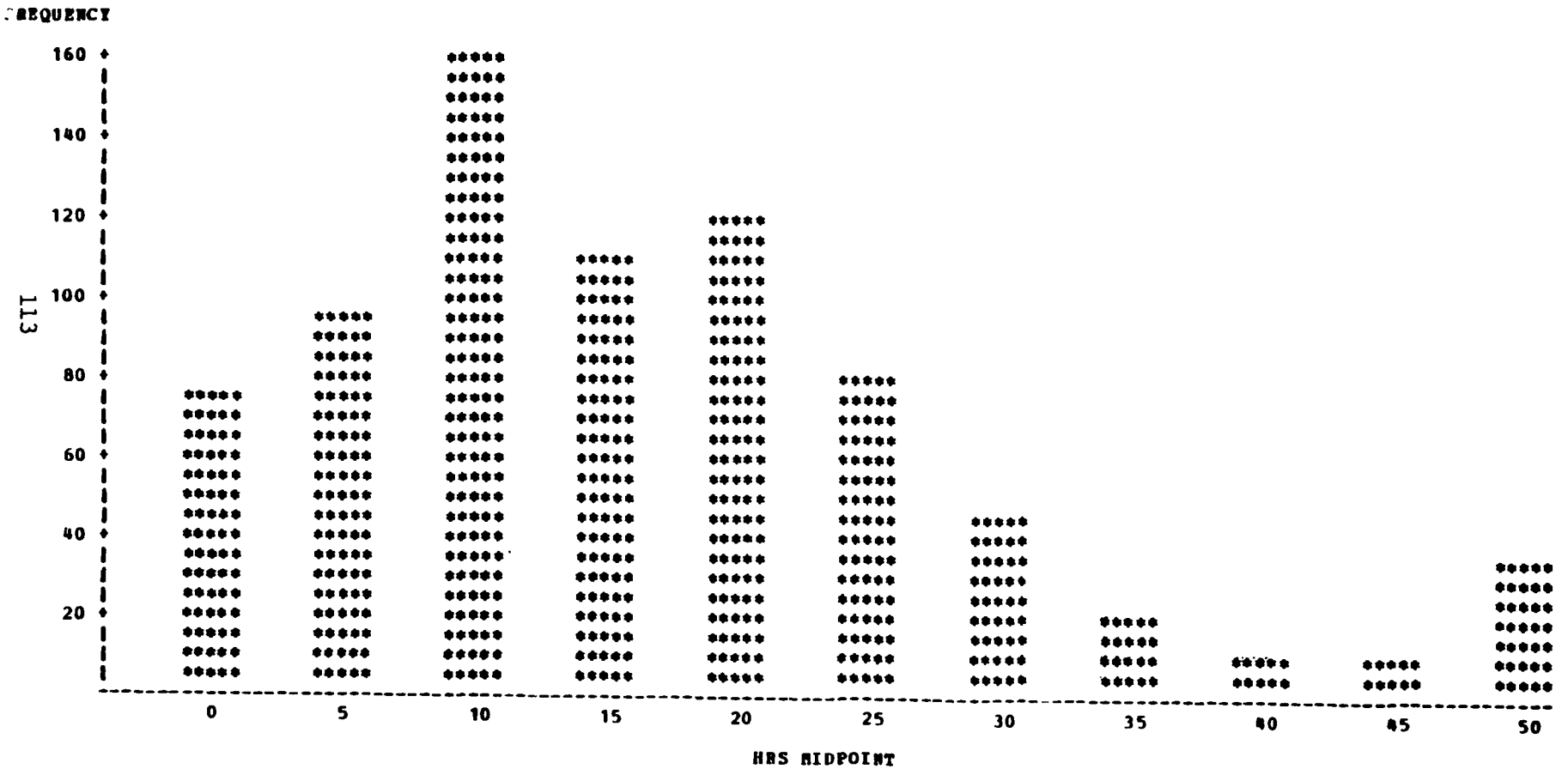
OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=COMBAT TRACKED VEHICLE, AVDS1790

FREQUENCY BAR CHART



OPERATIONAL DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-SEPTEMBER 1985
3RD ACR FT. BLISS, TEXAS
DISTRIBUTION FREQUENCIES FOR MILES AND HOURS
ENGINE=COMBAT TRACKED VEHICLE, AVDS1790

FREQUENCY BAR CHART



APPENDIX E

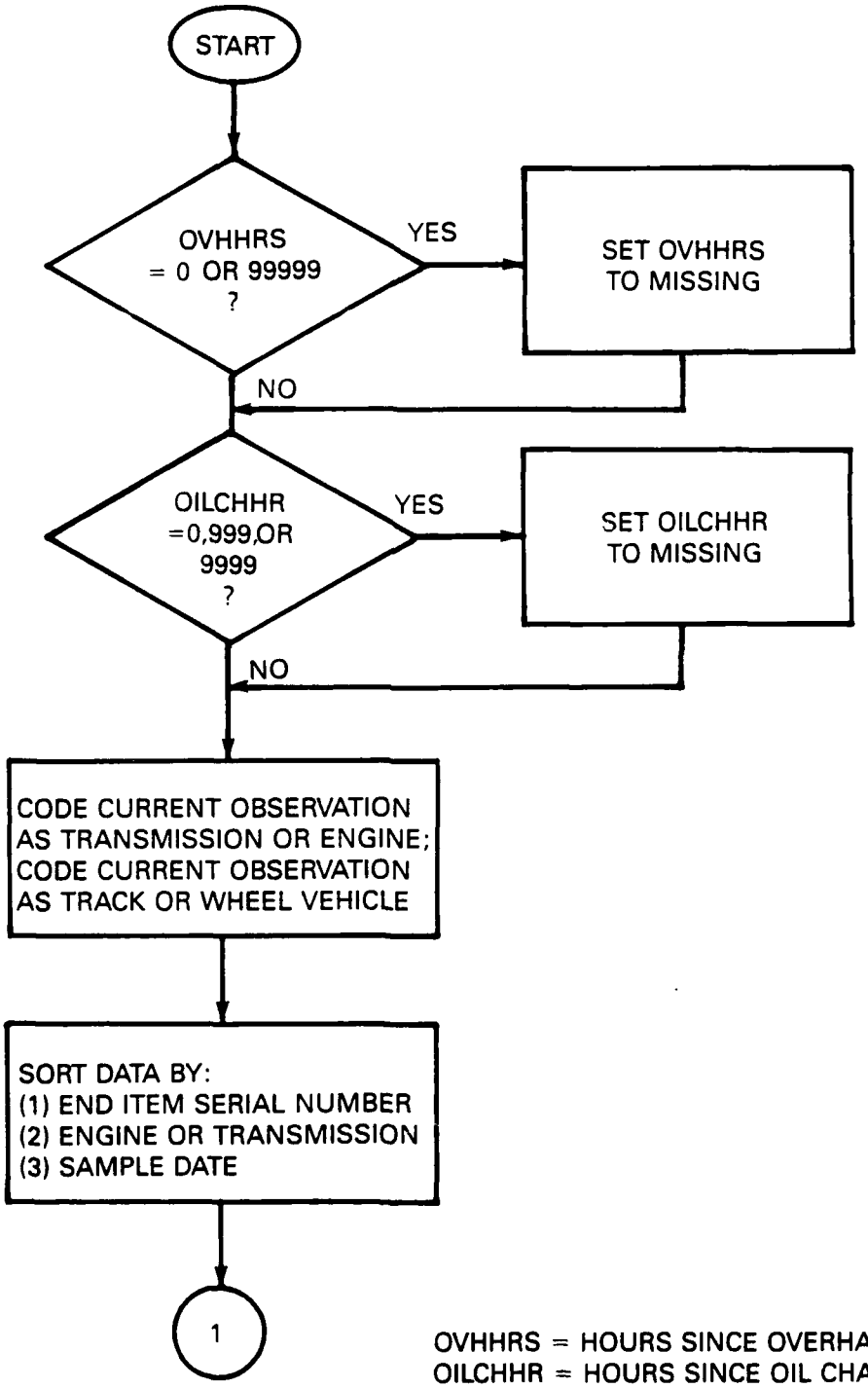
Oil Analysis Data Acquisition Procedures

OIL ANALYSIS DATA ACQUISITION PROCEDURES

A software program to retrieve the data was prepared. It was found that the data contained a notable number of erroneous entries. Errors existed in equipment Army designators, end-item and component serial numbers, oil change hours, and overhaul hours.

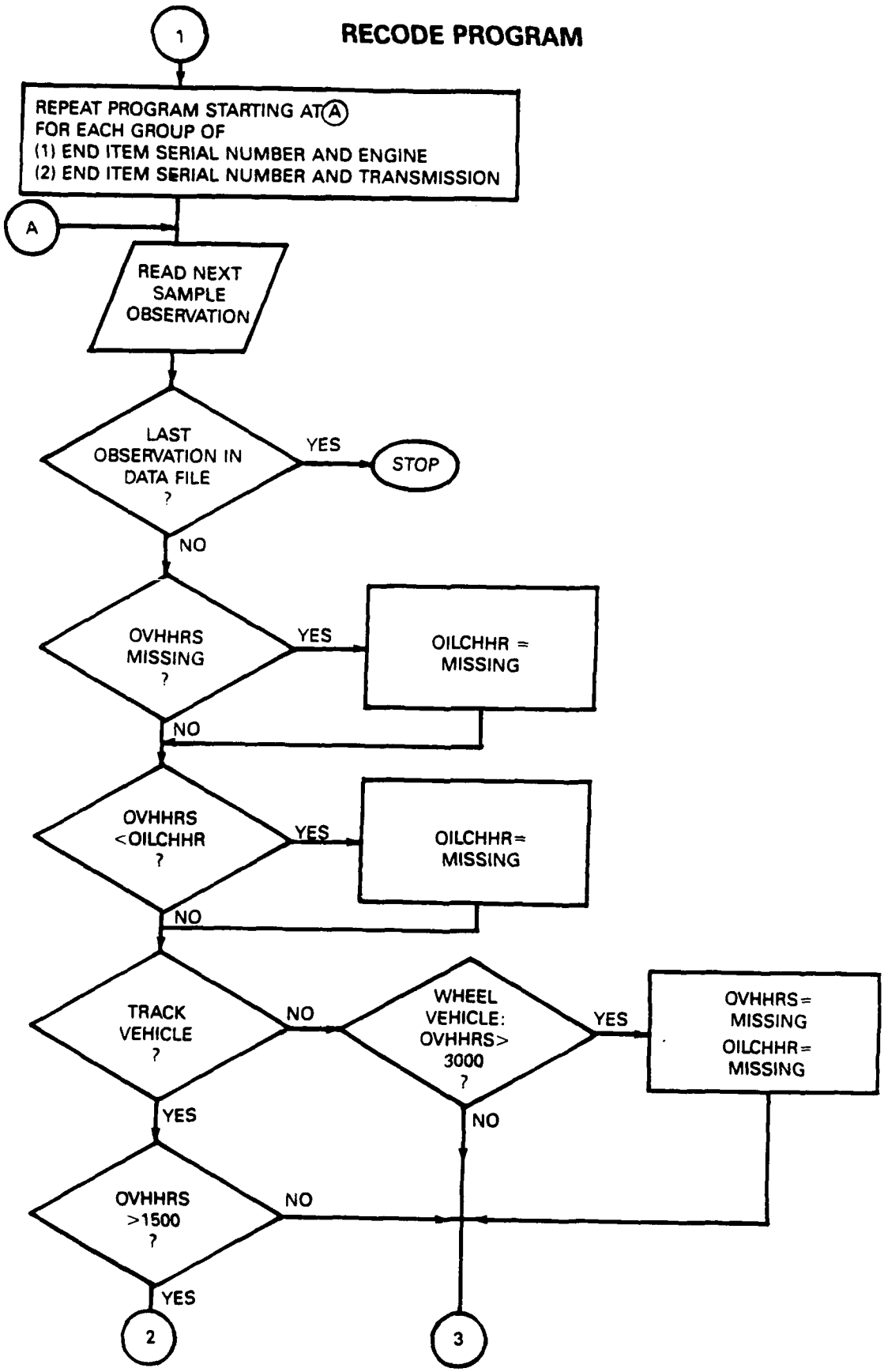
The following flow charts explain the data-handling procedures and operating parameters used to provide valid oil sample data.

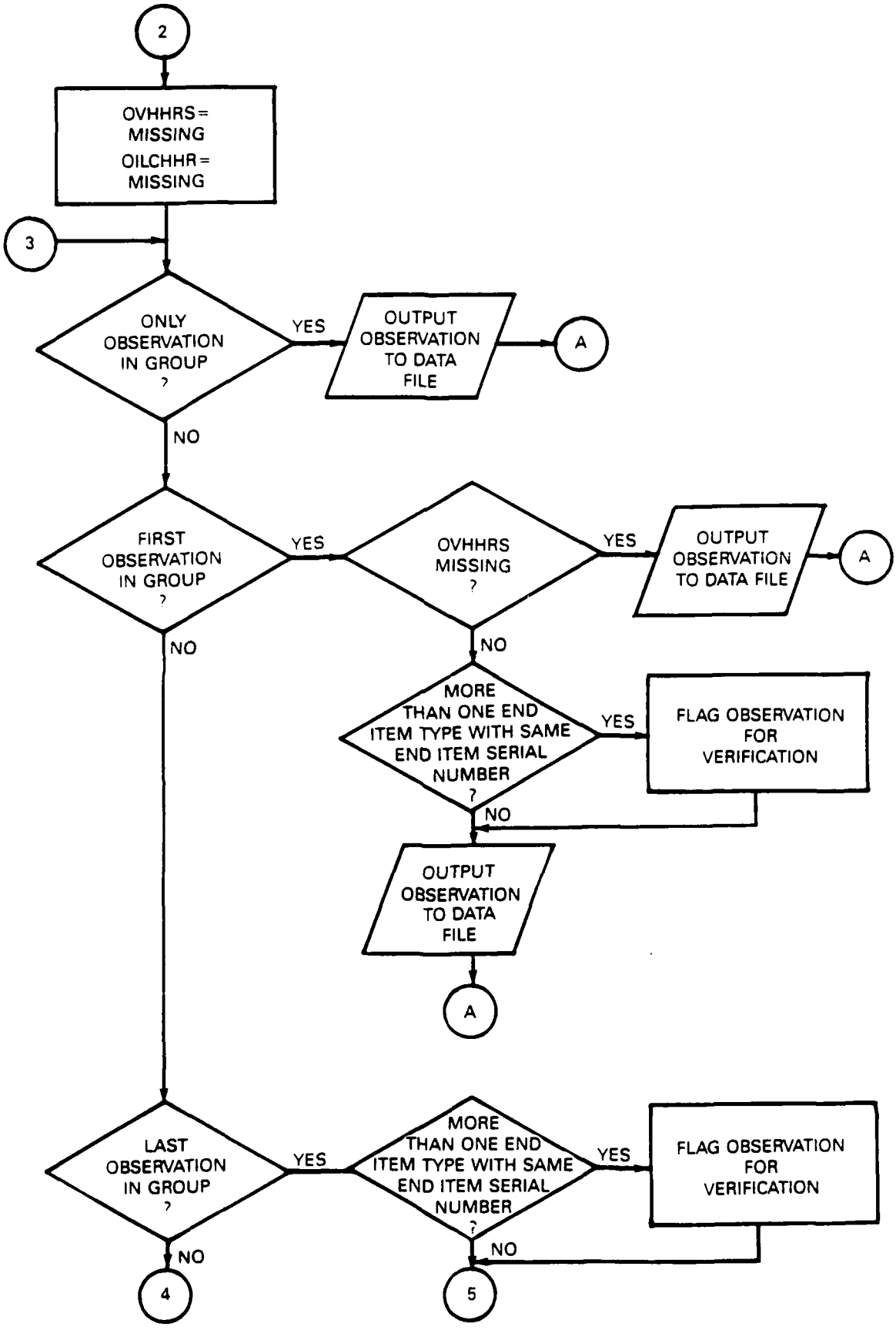
PRELIMINARY DATA PASS

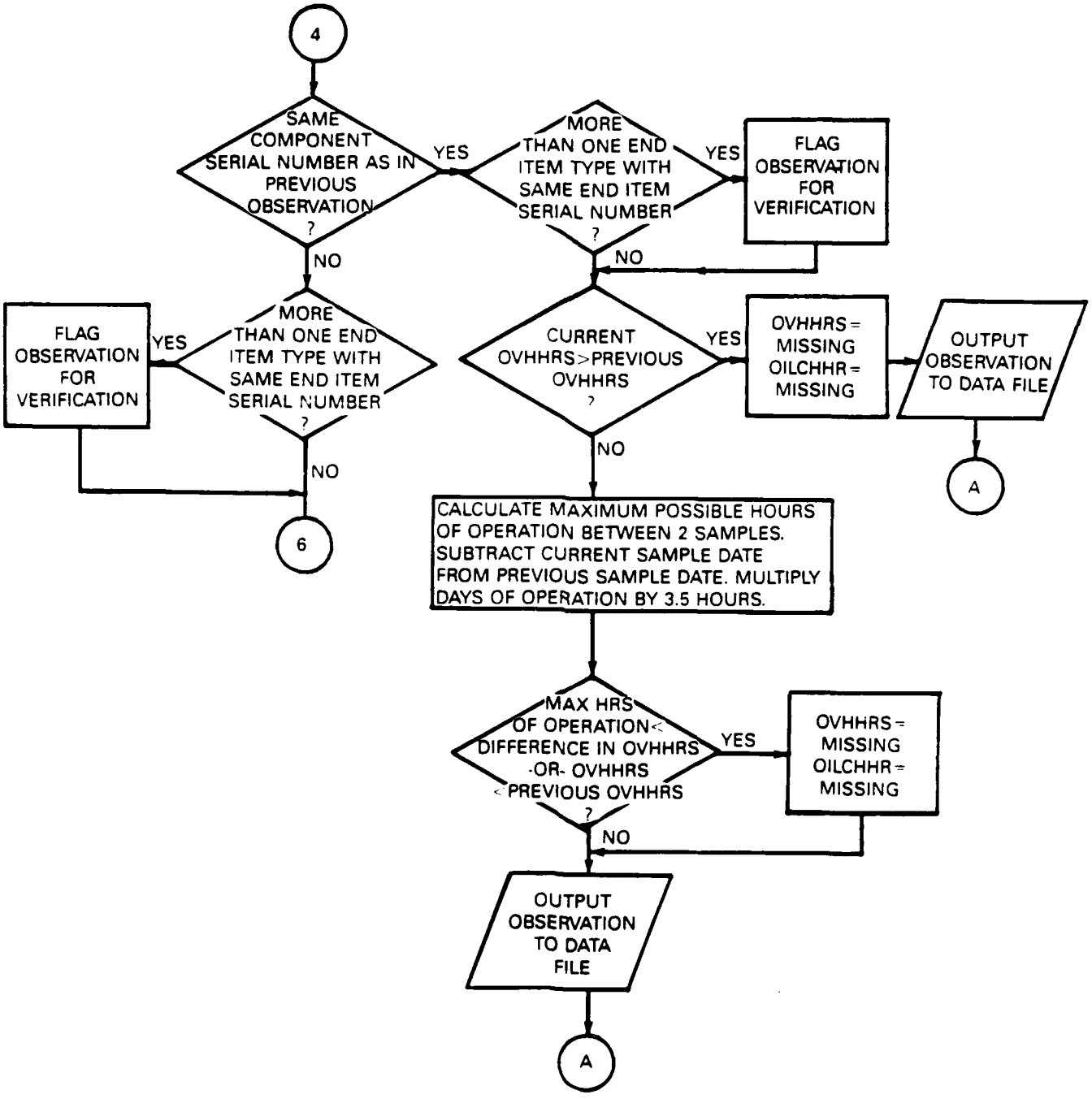


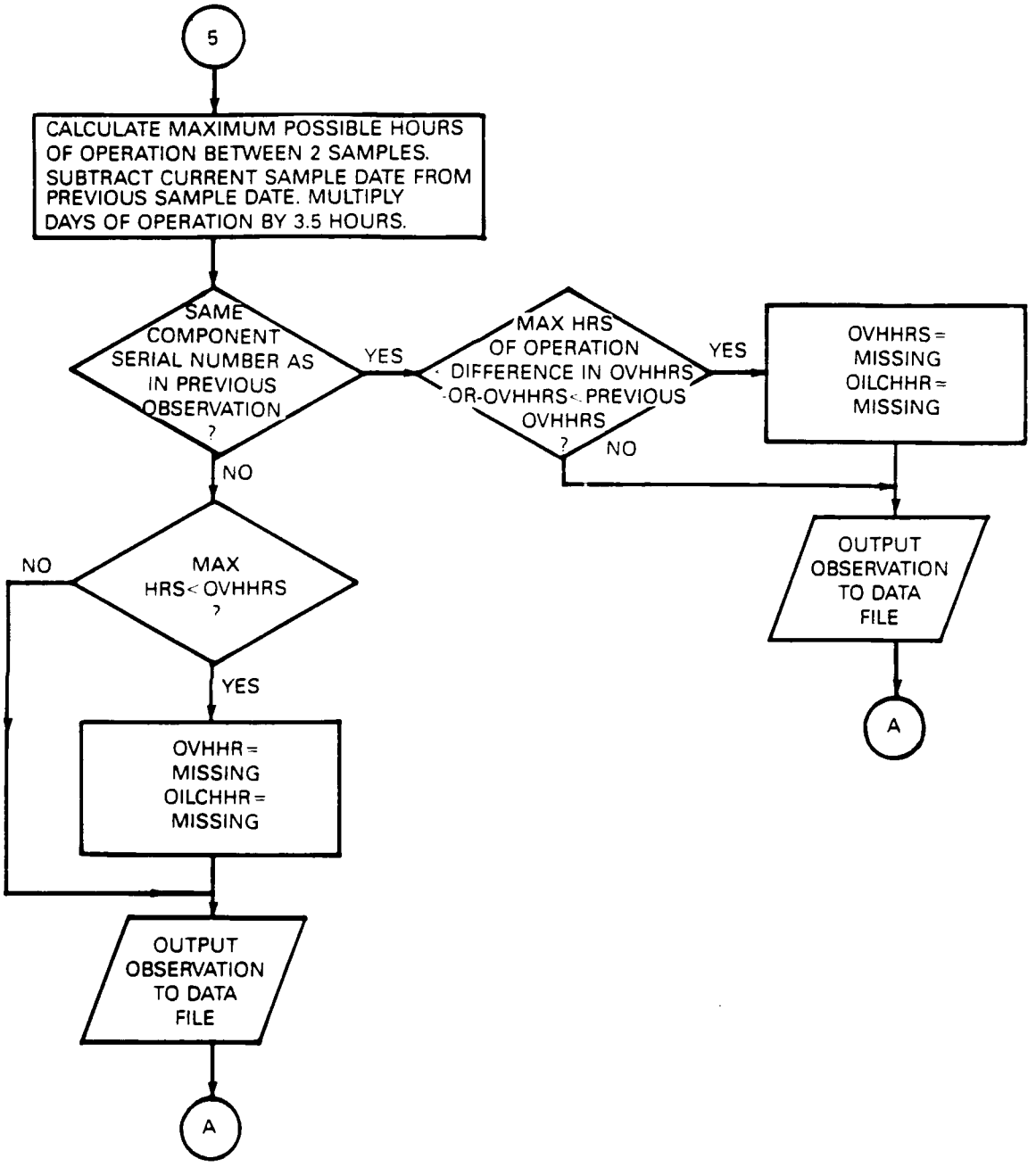
OVHHRS = HOURS SINCE OVERHAUL
OILCHHR = HOURS SINCE OIL CHANGE

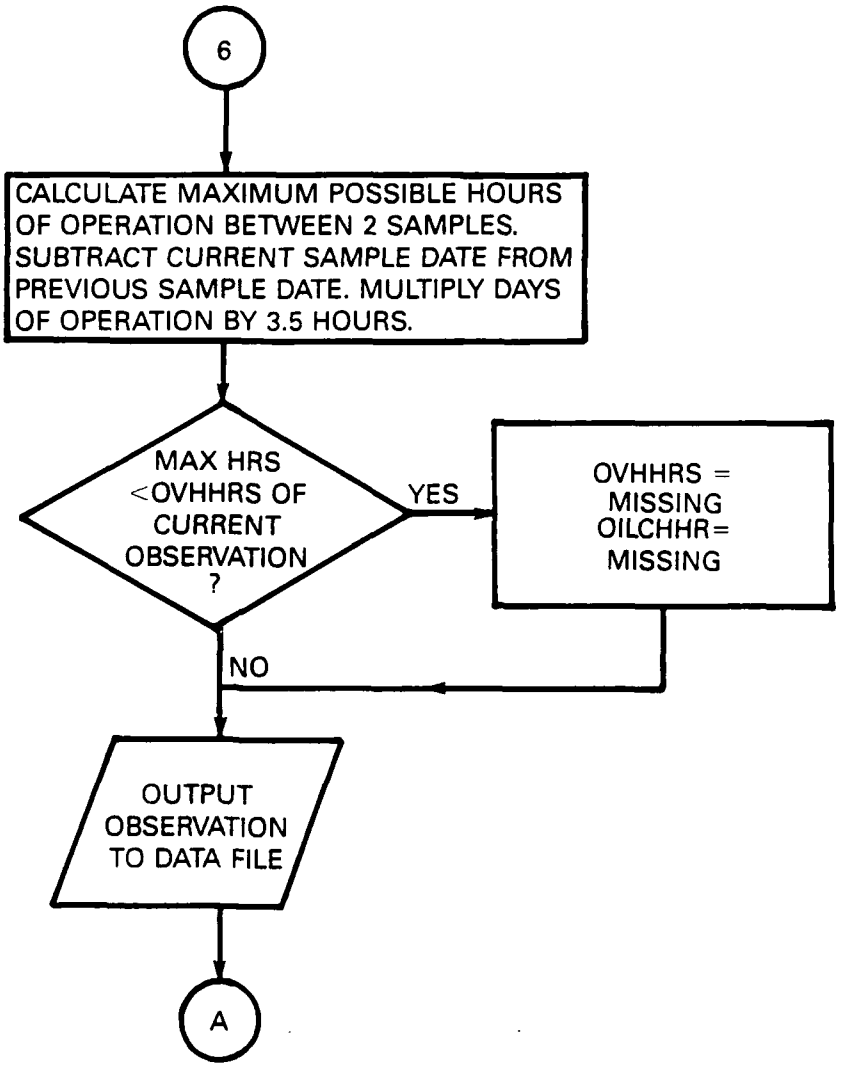
RECODE PROGRAM




2
OVHHRS = MISSING
OILCHHR = MISSING
3
ONLY OBSERVATION IN GROUP ?
YES
OUTPUT OBSERVATION TO DATA FILE
A
NO
FIRST OBSERVATION IN GROUP ?
YES
OVHHRS MISSING ?
YES
OUTPUT OBSERVATION TO DATA FILE
A
NO
NO
MORE THAN ONE END ITEM TYPE WITH SAME END ITEM SERIAL NUMBER ?
YES
FLAG OBSERVATION FOR VERIFICATION
NO
OUTPUT OBSERVATION TO DATA FILE
A
LAST OBSERVATION IN GROUP ?
YES
MORE THAN ONE END ITEM TYPE WITH SAME END ITEM SERIAL NUMBER ?
YES
FLAG OBSERVATION FOR VERIFICATION
NO
NO
4
5


4
SAME COMPONENT SERIAL NUMBER AS IN PREVIOUS OBSERVATION ?
YES
MORE THAN ONE END ITEM TYPE WITH SAME END ITEM SERIAL NUMBER ?
YES
FLAG OBSERVATION FOR VERIFICATION
NO
NO
FLAG OBSERVATION FOR VERIFICATION
YES
MORE THAN ONE END ITEM TYPE WITH SAME END ITEM SERIAL NUMBER ?
NO
6
CURRENT OVHHRS>PREVIOUS OVHHRS ?
YES
OVHHRS = MISSING OILCHHR = MISSING
OUTPUT OBSERVATION TO DATA FILE
A
NO
CALCULATE MAXIMUM POSSIBLE HOURS OF OPERATION BETWEEN 2 SAMPLES. SUBTRACT CURRENT SAMPLE DATE FROM PREVIOUS SAMPLE DATE. MULTIPLY DAYS OF OPERATION BY 3.5 HOURS.
MAX HRS OF OPERATION< DIFFERENCE IN OVHHRS -OR- OVHHRS < PREVIOUS OVHHRS ?
YES
OVHHRS = MISSING OILCHHR = MISSING
NO
OUTPUT OBSERVATION TO DATA FILE
A


5
CALCULATE MAXIMUM POSSIBLE HOURS OF OPERATION BETWEEN 2 SAMPLES. SUBTRACT CURRENT SAMPLE DATE FROM PREVIOUS SAMPLE DATE. MULTIPLY DAYS OF OPERATION BY 3.5 HOURS.
SAME COMPONENT SERIAL NUMBER AS IN PREVIOUS OBSERVATION ?
YES
MAX HRS OF OPERATION < DIFFERENCE IN OVHHRS -OR- OVHHRS < PREVIOUS OVHHRS ?
YES
NO
OVHHRS = MISSING OILCHHR = MISSING
OUTPUT OBSERVATION TO DATA FILE
A
NO
MAX HRS < OVHHRS ?
NO
YES
OVHHR = MISSING OILCHHR = MISSING
OUTPUT OBSERVATION TO DATA FILE
A


6
CALCULATE MAXIMUM POSSIBLE HOURS OF OPERATION BETWEEN 2 SAMPLES. SUBTRACT CURRENT SAMPLE DATE FROM PREVIOUS SAMPLE DATE. MULTIPLY DAYS OF OPERATION BY 3.5 HOURS.
MAX HRS <OVHHRS OF CURRENT OBSERVATION ?
YES
OVHHRS = MISSING OILCHHR= MISSING
NO
OUTPUT OBSERVATION TO DATA FILE
A

APPENDIX F

Means and Standard Deviations Calculated for Wear Metal Data

Fe, Cu, and Pb by End Item Type

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-AUGUST 1985
3RD ACR, FT. BLISS, TEXAS
MEANS AND STANDARD DEVIATIONS CALCULATED FOR WEAR METAL DATA,
FE, CU, AND PB
BY END ITEM TYPE

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	1CODE=M106	----------	
OVHRS	83	340.54	249.62	12.00	1483.00
OILCHNG	80	101.13	125.19	1.00	485.00
FE	156	118.37	80.61	11.00	535.00
AG	157	0.40	3.64	0.00	39.00
AL	157	5.96	10.90	0.00	93.00
CR	157	6.21	7.86	0.00	66.00
CU	154	15.53	27.67	3.00	285.00
SI	157	20.82	30.41	0.00	275.00
SN	157	7.20	7.24	0.00	43.00
NI	157	0.10	0.77	0.00	9.00
NA	157	16.85	31.40	0.00	297.00
PB	154	13.77	19.52	2.00	200.00
B	157	110.48	32.08	20.00	200.00
MO	157	0.10	0.59	0.00	6.00
----------		TE=ENGINE	1CODE=M109	----------	
OVHRS	2	364.50	78.49	309.00	420.00
OILCHNG	2	13.00	14.14	3.00	23.00
FE	108	109.81	70.16	2.00	325.00
AG	108	0.11	0.80	0.00	6.00
AL	108	5.41	8.22	0.00	59.00
CR	108	14.96	15.03	0.00	77.00
CU	107	59.94	114.40	5.00	797.00
SI	108	26.79	30.33	0.00	221.00
SN	108	14.00	15.51	0.00	81.00
NI	108	0.00	0.00	0.00	0.00
NA	108	27.09	59.47	0.00	600.00
PB	105	22.31	36.50	2.00	291.00
B	108	58.68	65.77	3.00	641.00
MO	108	0.02	0.19	0.00	2.00

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-21049 OS/NDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-AUGUST 1985
3RD ACR, FT. BLISS, TEXAS
MEANS AND STANDARD DEVIATIONS CALCULATED FOR WEAR METAL DATA,
FE, CU, AND PB
BY END ITEM TYPE

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M113	----------	
OVHRRS	470	244.46	231.06	1.00	1091.00
OILCHNG	437	80.73	126.19	1.00	953.00
FE	1074	108.21	72.52	7.00	998.00
AG	1076	0.03	0.70	0.00	19.00
AL	1076	3.85	13.86	0.00	347.00
CR	1076	4.19	4.88	0.00	75.00
CU	1064	16.28	25.43	2.00	592.00
SI	1076	15.34	22.15	0.00	392.00
SN	1076	11.06	13.29	0.00	93.00
NI	1076	0.08	0.58	0.00	9.00
NA	1076	66.88	140.70	0.00	998.00
PB	1068	17.67	23.54	2.00	323.00
B	1076	102.28	65.03	0.00	847.00
MO	1076	0.06	0.36	0.00	3.00
FENORM	470	1.71	4.73	0.03	60.50
CUNORM	466	0.33	0.88	0.00	9.00
PBNORM	467	0.50	1.67	0.00	16.67
----------		TE=ENGINE	TCODE=M185	----------	
OVHRRS	6	362.33	275.83	6.00	574.00
OILCHNG	6	9.83	6.65	3.00	20.00
FE	6	48.00	33.20	10.00	89.00
AG	6	0.00	0.00	0.00	0.00
AL	6	9.83	10.15	0.00	24.00
CR	6	4.67	5.79	0.00	13.00
CU	6	26.67	22.27	9.00	68.00
SI	6	15.50	8.57	7.00	26.00
SN	6	8.33	8.24	0.00	19.00
NI	6	0.33	0.82	0.00	2.00
NA	6	24.33	18.13	5.00	49.00
PB	6	14.67	9.58	5.00	29.00
B	6	75.33	43.74	13.00	133.00
MO	6	0.00	0.00	0.00	0.00
FENORM	6	1.39	2.51	0.04	6.36
CUNORM	6	0.66	0.96	0.02	2.21
PBNORM	6	0.50	0.83	0.01	2.07

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-21049 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-AUGUST 1985
3RD ACR, FT. BLISS, TEXAS
MEANS AND STANDARD DEVIATIONS CALCULATED FOR WEAR METAL DATA,
FE, CU, AND PB
BY END ITEM TYPE

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=4275	----------	
OVHRS	8	116.63	91.55	3.00	219.00
OILCHHR	8	15.38	14.85	2.00	48.00
FE	8	19.75	11.85	7.00	45.00
AG	8	0.00	0.00	0.00	0.00
AL	8	3.50	3.42	0.00	11.00
CR	8	2.38	2.20	0.00	7.00
CU	8	10.50	4.66	5.00	16.00
SI	8	6.63	2.39	4.00	11.00
SN	8	1.13	2.10	0.00	5.00
NI	8	0.00	0.00	0.00	0.00
NA	8	9.25	2.19	6.00	13.00
PB	8	11.88	5.49	5.00	19.00
B	8	118.13	28.32	81.00	169.00
MO	8	0.00	0.00	0.00	0.00
----------		TE=ENGINE	TCODE=M35A	----------	
OVHRS	169	750.65	585.62	3.00	2451.00
OILCHHR	150	185.34	349.72	1.00	2451.00
FE	347	71.92	55.80	2.00	449.00
AG	347	0.07	1.40	0.00	26.00
AL	347	14.27	13.35	0.00	104.00
CR	347	6.58	6.03	0.00	39.00
CU	343	17.26	11.92	3.00	108.00
SI	347	23.58	34.20	0.00	420.00
SN	347	4.24	6.05	0.00	29.00
NI	347	0.59	1.13	0.00	5.00
NA	347	15.87	18.60	0.00	153.00
PB	346	19.72	17.37	2.00	187.00
B	347	94.99	39.83	2.00	320.00
MO	347	0.07	0.39	0.00	3.00

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-AUGUST 1985
3RD ACR, FT. BLISS, TEXAS
MEANS AND STANDARD DEVIATIONS CALCULATED FOR WEAR METAL DATA,
FE, CU, AND PB
BY END ITEM TYPE

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=ENGINE TCODE=M36A					
OVHRS	17	1248.18	534.09	26.00	1954.00
OILCHGR	17	147.59	350.78	1.00	1468.00
FE	34	78.88	74.87	3.00	283.00
AG	34	0.00	0.00	0.00	0.00
AL	34	16.74	19.62	0.00	79.00
CR	34	9.24	14.83	0.00	64.00
CU	34	14.45	9.66	2.00	39.00
SI	34	28.18	37.66	3.00	196.00
SN	34	1.59	5.00	0.00	19.00
NI	34	0.50	1.26	0.00	5.00
NA	34	14.18	10.26	3.00	39.00
PB	34	15.30	10.60	2.00	44.00
B	34	97.18	43.98	14.00	166.00
MO	34	0.18	0.58	0.00	2.00
TE=ENGINE TCODE=M49A					
OVHRS	2	31.50	17.68	19.00	44.00
OILCHGR	2	5.50	3.54	3.00	8.00
FE	10	97.30	95.78	7.00	278.00
AG	10	0.00	0.00	0.00	0.00
AL	10	29.90	31.25	3.00	96.00
CR	10	12.90	15.66	0.00	46.00
CU	10	20.50	14.33	6.00	49.00
SI	10	48.80	61.10	5.00	195.00
SN	10	2.90	2.64	0.00	6.00
NI	10	0.40	1.26	0.00	4.00
NA	10	12.70	8.18	3.00	33.00
PB	10	26.60	19.74	5.00	62.00
B	10	66.90	21.16	30.00	98.00
MO	10	0.40	0.84	0.00	2.00

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-AUGUST 1985
3RD ACR, FT. BLISS, TEXAS
MEANS AND STANDARD DEVIATIONS CALCULATED FOR WEAR METAL DATA,
FE, CU, AND PB
BY END ITEM TYPE

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M52A	----------	
OVHRS	41	591.85	530.73	5.00	2174.00
OILCHG	41	26.46	28.58	1.00	128.00
FE	56	59.89	57.27	7.00	214.00
AG	56	0.00	0.00	0.00	0.00
AL	56	12.96	14.42	0.00	65.00
CR	56	5.46	6.38	0.00	25.00
CU	55	15.07	11.86	3.00	55.00
SI	56	28.50	39.87	5.00	261.00
SN	56	3.25	5.29	0.00	21.00
NI	56	0.13	0.54	0.00	3.00
NA	56	14.27	16.36	0.00	99.00
PB	53	14.62	11.94	4.00	57.00
B	56	98.54	37.98	0.00	189.00
MO	56	0.59	2.36	0.00	11.00
----------		TE=ENGINE	TCODE=M54A	----------	
OVHRS	63	523.08	459.98	23.00	1737.00
OILCHG	55	70.82	161.38	1.00	1183.00
FE	133	110.41	104.87	7.00	998.00
AG	133	0.00	0.00	0.00	0.00
AL	133	31.88	76.11	0.00	869.00
CR	133	12.65	18.29	0.00	193.00
CU	131	21.26	27.63	4.00	309.00
SI	133	51.17	98.80	5.00	998.00
SN	133	5.71	9.03	0.00	81.00
NI	133	0.66	2.83	0.00	31.00
NA	133	20.65	25.67	0.00	200.00
PB	131	24.66	26.00	3.00	239.00
B	133	88.44	40.23	2.00	187.00
MO	133	0.16	0.59	0.00	4.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M543	----------	
OVHRS	16	592.50	413.87	39.00	1335.00
OILCHGR	14	139.43	315.11	3.00	1208.00
FE	36	87.78	66.58	2.00	212.00
AG	36	0.00	0.00	0.00	0.00
AL	36	19.50	19.58	0.00	74.00
CR	36	10.89	11.94	0.00	47.00
CU	34	22.68	12.44	5.00	48.00
SI	36	30.22	21.74	4.00	76.00
SN	36	6.17	8.85	0.00	41.00
NI	36	0.64	1.27	0.00	4.00
NA	36	24.97	26.80	2.00	115.00
PB	36	26.11	25.39	2.00	100.00
B	36	85.53	40.58	5.00	192.00
MO	36	0.25	0.81	0.00	4.00
----------		TE=ENGINE	TCODE=M548	----------	
OVHRS	24	227.08	390.87	41.00	1480.00
OILCHGR	21	46.71	36.12	1.00	99.00
FE	121	79.51	52.26	5.00	323.00
AG	121	0.05	0.38	0.00	3.00
AL	121	5.04	9.93	0.00	69.00
CR	121	5.61	6.92	0.00	41.00
CU	121	16.87	27.25	2.00	256.00
SI	121	23.34	33.60	5.00	210.00
SN	121	7.91	8.83	0.00	54.00
NI	121	0.00	0.00	0.00	0.00
NA	121	46.19	117.63	0.00	600.00
PB	119	17.76	53.47	2.00	564.00
B	121	125.73	101.39	4.00	998.00
MO	121	0.05	0.31	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=ENGINE TCODE=M55A					
OVHHRS	2	763.50	222.74	606.00	921.00
OILCHHR	2	1.00	0.00	1.00	1.00
FE	6	44.33	20.76	18.00	70.00
AG	6	0.00	0.00	0.00	0.00
AL	6	11.83	6.65	5.00	21.00
CR	6	3.50	2.59	0.00	7.00
CU	6	12.00	4.00	6.00	17.00
SI	6	15.00	7.35	9.00	27.00
SN	6	0.83	2.04	0.00	5.00
NI	6	0.00	0.00	0.00	0.00
NA	6	9.33	6.35	5.00	18.00
PB	6	19.83	11.72	6.00	36.00
B	6	131.17	15.94	108.00	146.00
MO	6	0.33	0.82	0.00	2.00
TE=ENGINE TCODE=M561					
OVHHRS	12	679.42	1106.85	30.00	2532.00
OILCHHR	11	504.64	1002.50	30.00	2532.00
FE	72	103.28	62.00	4.00	317.00
AG	72	0.15	0.91	0.00	6.00
AL	72	10.44	9.81	0.00	44.00
CR	72	5.49	4.60	0.00	25.00
CU	70	22.07	21.48	3.00	129.00
SI	72	26.58	19.40	0.00	101.00
SN	72	9.79	13.62	0.00	79.00
NI	72	0.03	0.24	0.00	2.00
NA	72	17.89	13.42	0.00	58.00
PB	72	15.17	12.66	2.00	65.00
B	72	116.64	116.25	25.00	749.00
MO	72	0.08	0.50	0.00	3.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=ENGINE TCODE=M577					
OVHHRS	99	313.34	234.31	3.00	988.00
OILCHHR	80	50.17	76.59	1.00	372.00
FE	214	84.58	71.13	3.00	465.00
AG	216	0.13	1.30	0.00	18.00
AL	216	3.64	6.39	0.00	43.00
CR	216	3.96	4.69	0.00	30.00
CU	205	20.18	30.53	2.00	209.00
SI	216	14.78	14.28	0.00	104.00
SN	216	8.63	14.17	0.00	86.00
NI	216	0.20	0.94	0.00	7.00
NA	216	30.55	53.88	0.00	344.00
PB	212	15.77	21.89	2.00	172.00
B	216	101.20	37.98	0.00	233.00
MO	216	0.25	0.81	0.00	6.00
TE=ENGINE TCODE=M578					
OVHHRS	5	36.20	37.49	1.00	99.00
OILCHHR	5	36.20	37.49	1.00	99.00
FE	13	73.69	45.14	2.00	149.00
AG	13	0.00	0.00	0.00	0.00
AL	13	6.54	8.05	0.00	28.00
CR	13	7.00	9.00	0.00	34.00
CU	12	46.75	35.38	6.00	117.00
SI	13	34.08	28.26	5.00	96.00
SN	13	15.08	15.61	0.00	39.00
NI	13	0.31	1.11	0.00	4.00
NA	13	21.62	11.63	5.00	44.00
PB	13	20.69	15.64	3.00	48.00
B	13	80.85	45.76	4.00	151.00
MO	13	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=ENGINE TCODE=M60A					
OVHRS	456	312.05	152.27	2.00	1200.00
OILCHHR	413	83.50	107.28	1.00	722.00
FE	1125	126.59	103.15	2.00	871.00
AG	1126	0.80	3.05	0.00	59.00
AL	1126	20.64	20.60	0.00	207.00
CR	1126	6.79	5.13	0.00	45.00
CU	1121	33.26	36.93	3.00	461.00
SI	1126	57.29	56.81	3.00	617.00
SN	1126	1.56	3.41	0.00	51.00
NI	1126	2.70	2.72	0.00	19.00
NA	1126	75.72	150.99	0.00	998.00
PB	1115	17.10	14.61	2.00	148.00
B	1126	97.16	39.88	0.00	194.00
MO	1126	2.14	1.90	0.00	21.00
TE=ENGINE TCODE=M728					
OVHRS	3	448.67	135.02	321.00	590.00
OILCHHR	2	261.50	245.37	88.00	435.00
FE	13	114.62	68.71	31.00	281.00
AG	13	2.77	6.35	0.00	18.00
AL	13	17.23	18.22	3.00	69.00
CR	13	5.00	3.79	0.00	15.00
CU	13	75.38	98.04	11.00	282.00
SI	13	56.38	44.13	15.00	169.00
SN	13	3.31	3.48	0.00	11.00
NI	13	1.85	2.44	0.00	8.00
NA	13	336.85	314.14	8.00	800.00
PB	13	50.46	33.66	16.00	114.00
B	13	73.23	62.73	3.00	185.00
MO	13	1.31	1.32	0.00	3.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=ENGINE TCODE=M792					
OVHRS	0	.	.	.	.
OILCHNG	0	.	.	.	.
FE	6	105.83	87.86	47.00	279.00
AG	6	0.00	0.00	0.00	0.00
AL	6	20.33	25.03	7.00	71.00
CR	6	7.50	5.96	3.00	19.00
CU	6	20.17	9.72	11.00	39.00
SI	6	56.50	72.88	21.00	205.00
SN	6	7.50	9.96	0.00	25.00
NI	6	0.00	0.00	0.00	0.00
NA	6	17.00	10.49	8.00	36.00
PB	6	12.50	8.24	7.00	29.00
B	6	106.50	48.04	15.00	142.00
MO	6	0.33	0.82	0.00	2.00
TE=ENGINE TCODE=M813					
OVHRS	57	1208.65	861.46	9.00	2238.00
OILCHNG	41	31.15	33.53	1.00	191.00
FE	80	57.22	49.16	3.00	295.00
AG	80	0.00	0.00	0.00	0.00
AL	80	9.11	16.36	0.00	137.00
CR	80	7.74	8.08	0.00	41.00
CU	78	13.23	9.82	3.00	46.00
SI	80	23.40	38.34	3.00	326.00
SN	80	0.67	2.15	0.00	12.00
NI	80	0.17	0.63	0.00	3.00
NA	80	13.82	17.21	0.00	137.00
PB	79	18.28	21.02	3.00	161.00
B	80	110.04	48.72	5.00	196.00
MO	80	0.05	0.31	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M816	----------	
OVHRS	1	843.00	.	843.00	843.00
OILCHR	1	511.00	.	511.00	511.00
FE	1	21.00	.	21.00	21.00
AG	1	0.00	.	0.00	0.00
AL	1	3.00	.	3.00	3.00
CR	1	0.00	.	0.00	0.00
CU	1	4.00	.	4.00	4.00
SI	1	17.00	.	17.00	17.00
SN	1	0.00	.	0.00	0.00
NI	1	0.00	.	0.00	0.00
NA	1	23.00	.	23.00	23.00
PB	1	6.00	.	6.00	6.00
B	1	37.00	.	37.00	37.00
MO	1	0.00	.	0.00	0.00
----------		TE=ENGINE	TCODE=M817	----------	
OVHRS	2	1599.50	596.09	1178.00	2021.00
OILCHR	2	79.00	108.89	2.00	156.00
FE	16	91.44	77.66	5.00	263.00
AG	16	0.13	0.50	0.00	2.00
AL	16	8.81	8.84	0.00	27.00
CR	16	7.31	9.04	0.00	36.00
CU	15	21.53	22.40	5.00	86.00
SI	16	25.88	33.17	4.00	143.00
SN	16	0.31	0.87	0.00	3.00
NI	16	0.00	0.00	0.00	0.00
NA	16	15.63	17.59	0.00	65.00
PB	15	25.80	24.34	6.00	79.00
B	16	101.94	46.55	13.00	153.00
MO	16	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M818	----------	
OVHHRS	21	939.19	941.33	2.00	2912.00
OILCHHR	21	139.76	357.89	2.00	1652.00
FE	48	36.75	23.76	6.00	107.00
AG	48	0.00	0.00	0.00	0.00
AL	48	4.33	5.80	0.00	35.00
CR	48	3.85	3.51	0.00	14.00
CU	47	8.04	6.51	3.00	40.00
SI	48	9.96	8.99	0.00	50.00
SN	48	0.73	1.88	0.00	9.00
NI	48	0.04	0.29	0.00	2.00
NA	48	8.54	8.71	0.00	43.00
PB	47	9.26	7.00	3.00	36.00
B	48	113.71	40.88	0.00	199.00
MO	48	0.04	0.29	0.00	2.00

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M88A	----------	
OVHHRS	51	489.43	305.15	5.00	1139.00
OILCHHR	38	77.42	141.42	1.00	830.00
FE	98	151.24	130.28	4.00	600.00
AG	100	0.52	2.15	0.00	15.00
AL	100	15.44	15.06	0.00	85.00
CR	100	5.58	4.33	0.00	22.00
CU	98	49.38	101.41	5.00	771.00
SI	100	45.68	44.94	3.00	266.00
SN	100	2.23	4.04	0.00	28.00
NI	100	2.26	2.58	0.00	10.00
NA	100	51.34	75.55	0.00	339.00
PB	99	20.17	17.92	3.00	98.00
B	100	87.42	38.90	3.00	182.00
MO	100	1.93	1.87	0.00	7.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=ENGINE TCODE=M911					
OVHRS	5	388.20	72.66	320.00	500.00
OILCHG	5	45.00	49.21	8.00	131.00
FE	6	82.83	109.96	21.00	303.00
AG	6	0.00	0.00	0.00	0.00
AL	6	6.17	3.49	3.00	11.00
CR	6	5.50	7.87	0.00	21.00
CU	6	69.83	75.48	5.00	173.00
SI	6	22.67	21.12	6.00	55.00
SN	6	12.33	17.67	0.00	43.00
NI	6	0.00	0.00	0.00	0.00
NA	6	41.67	33.56	12.00	89.00
PB	6	14.33	6.83	4.00	22.00
B	6	51.17	48.30	7.00	114.00
MO	6	0.00	0.00	0.00	0.00
TE=ENGINE TCODE=M916					
OVHRS	0	.	.	.	.
OILCHG	0	.	.	.	.
FE	3	54.00	21.93	35.00	78.00
AG	3	0.00	0.00	0.00	0.00
AL	3	8.33	3.51	5.00	12.00
CR	3	2.00	0.00	2.00	2.00
CU	3	15.00	6.93	11.00	23.00
SI	3	14.67	5.51	11.00	21.00
SN	3	0.00	0.00	0.00	0.00
NI	3	0.00	0.00	0.00	0.00
NA	3	10.67	2.52	8.00	13.00
PB	3	11.67	6.35	8.00	19.00
B	3	81.00	45.90	30.00	119.00
MO	3	0.67	1.15	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=ENGINE TCODE=M936					
OVHRS	2	58.50	19.09	45.00	72.00
OILCHR	1	41.00	.	41.00	41.00
FE	3	43.33	7.51	39.00	52.00
AG	3	0.00	0.00	0.00	0.00
AL	3	12.67	7.37	7.00	21.00
CR	3	1.67	1.53	0.00	3.00
CU	3	45.33	4.93	42.00	51.00
SI	3	17.67	3.06	15.00	21.00
SN	3	1.00	1.73	0.00	3.00
NI	3	0.00	0.00	0.00	0.00
NA	3	31.00	6.24	24.00	36.00
PB	3	29.67	11.72	21.00	43.00
B	3	10.33	10.21	3.00	22.00
MO	3	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
---------- TE=TRANSMISSION TCODE=M106 ----------					
OVHRS	73	226.93	185.85	9.00	1276.00
OILCHR	67	95.00	91.89	4.00	377.00
FE	130	66.32	72.60	2.00	553.00
AG	14	4.21	2.15	2.00	9.00
AL	132	11.02	9.05	0.00	46.00
CR	132	0.19	0.97	0.00	7.00
CU	127	65.57	62.66	7.00	465.00
SI	132	21.30	17.03	0.00	145.00
SN	132	2.17	3.81	0.00	27.00
NI	132	0.08	0.52	0.00	5.00
NA	132	12.55	14.91	0.00	139.00
PB	132	147.64	148.85	0.00	643.00
B	132	391.14	352.08	0.00	998.00
MO	132	0.14	0.56	0.00	4.00
---------- TE=TRANSMISSION TCODE=M109 ----------					
OVHRS	7	870.29	688.35	12.00	1500.00
OILCHR	4	38.50	7.19	32.00	48.00
FE	50	114.94	66.87	29.00	375.00
AG	49	11.33	5.42	3.00	27.00
AL	50	6.16	3.73	0.00	16.00
CR	50	0.94	1.32	0.00	5.00
CU	50	251.06	184.29	35.00	831.00
SI	50	21.62	9.24	9.00	43.00
SN	50	3.72	2.84	0.00	9.00
NI	50	0.00	0.00	0.00	0.00
NA	50	12.28	8.15	0.00	41.00
PB	50	49.08	29.32	8.00	161.00
B	50	244.34	215.77	35.00	915.00
MO	50	0.04	0.28	0.00	2.00

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---------- TE=TRANSMISSION TCODE=M113 ----------					
OVHRS	235	252.40	256.57	3.00	1371.00
OILCHR	212	92.01	105.19	1.00	803.00
FE	360	50.20	61.63	2.00	998.00
AG	3	3.00	1.73	2.00	5.00
AL	360	10.30	9.17	0.00	70.00
CR	360	0.27	1.49	0.00	18.00
CU	356	43.11	41.99	3.00	351.00
SI	360	19.57	13.15	0.00	140.00
SN	360	1.79	3.43	0.00	47.00
NI	360	0.02	0.30	0.00	5.00
NA	360	17.68	57.57	0.00	763.00
PB	360	80.19	98.17	0.00	763.00
B	360	363.97	336.35	0.00	998.00
MO	360	0.04	0.30	0.00	3.00
---------- TE=TRANSMISSION TCODE=M548 ----------					
OVHRS	36	257.33	404.69	21.00	1439.00
OILCHR	34	42.71	52.04	1.00	287.00
FE	85	43.93	58.46	7.00	355.00
AG	3	3.00	1.00	2.00	4.00
AL	86	5.67	7.33	0.00	50.00
CR	86	0.48	1.40	0.00	7.00
CU	85	53.73	71.46	7.00	487.00
SI	86	20.36	20.32	0.00	148.00
SN	86	1.17	2.42	0.00	16.00
NI	86	0.02	0.22	0.00	2.00
NA	86	25.30	106.65	0.00	998.00
PB	86	127.34	104.35	3.00	437.00
B	86	242.95	274.14	0.00	998.00
MO	86	0.03	0.32	0.00	3.00

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JANUARY-DECEMBER 1984
3RD ACR FT. BLISS, TEXAS
MEANS AND STANDARD DEVIATIONS CALCULATED FOR WEAR METAL DATA,
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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=TRANSMISSION TCODE=M551					
OVHRS	0	.	.	.	.
OILCHNG	0	.	.	.	.
FE	2	355.50	48.79	321.00	390.00
AG	2	18.00	0.00	18.00	18.00
AL	2	15.00	1.41	14.00	16.00
CR	2	2.00	0.00	2.00	2.00
CU	2	457.00	2.83	455.00	459.00
SI	2	91.00	5.66	87.00	95.00
SN	2	8.50	3.54	6.00	11.00
NI	2	0.00	0.00	0.00	0.00
NA	2	13.50	0.71	13.00	14.00
PB	2	97.00	2.83	95.00	99.00
B	2	289.50	36.06	264.00	315.00
MO	2	0.00	0.00	0.00	0.00
TE=TRANSMISSION TCODE=M577					
OVHRS	54	328.28	312.27	2.00	1493.00
OILCHNG	45	87.60	112.99	1.00	544.00
FE	100	49.91	57.49	4.00	341.00
AG	4	8.50	4.36	2.00	11.00
AL	101	8.20	9.42	0.00	56.00
CR	101	0.42	2.13	0.00	16.00
CU	101	53.49	61.01	3.00	270.00
SI	101	20.07	16.25	6.00	99.00
SN	101	1.64	3.46	0.00	20.00
NI	101	0.03	0.30	0.00	3.00
NA	101	11.16	10.71	0.00	76.00
PB	101	132.22	111.70	0.00	392.00
B	101	371.38	319.77	9.00	998.00
MO	101	0.04	0.28	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=TRANSMISSION TCODE=M578					
OVHRS	2	516.00	675.99	38.00	994.00
OILCHGR	2	24.00	5.66	20.00	28.00
FE	11	67.45	25.86	27.00	95.00
AG	10	12.20	2.44	9.00	18.00
AL	11	4.91	2.12	0.00	7.00
CR	11	1.82	1.25	0.00	3.00
CU	10	306.10	164.29	93.00	572.00
SI	11	21.27	7.47	9.00	33.00
SN	11	2.82	2.32	0.00	5.00
NI	11	0.27	0.90	0.00	3.00
NA	11	12.27	5.24	4.00	19.00
PB	11	34.27	18.01	4.00	53.00
B	11	502.73	310.31	69.00	981.00
MO	11	0.00	0.00	0.00	0.00
TE=TRANSMISSION TCODE=M60A					
OVHRS	404	267.44	165.63	1.00	1000.00
OILCHGR	330	96.46	106.01	1.00	871.00
FE	822	181.52	144.48	2.00	999.00
AG	757	20.63	17.16	2.00	121.00
AL	827	7.87	12.51	0.00	220.00
CR	827	2.58	2.74	0.00	25.00
CU	821	275.29	205.11	3.00	998.00
SI	827	35.10	44.01	0.00	566.00
SN	827	11.06	10.72	0.00	101.00
NI	827	0.26	0.99	0.00	9.00
NA	827	13.75	27.29	0.00	512.00
PB	827	65.16	45.48	0.00	557.00
B	827	359.78	312.95	0.00	998.00
MO	827	0.17	0.68	0.00	7.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
---------- TE=TRANSMISSION TCODE=M728 ----------					
OVHRS	5	357.40	194.47	209.00	583.00
OILCHR	4	210.25	263.28	24.00	583.00
FE	7	270.71	172.98	52.00	587.00
AG	7	16.57	9.85	3.00	31.00
AL	7	6.57	3.51	0.00	11.00
CR	7	2.00	1.53	0.00	4.00
CU	7	336.00	186.64	69.00	600.00
SI	7	30.86	4.30	26.00	37.00
SN	7	9.57	4.72	3.00	17.00
NI	7	0.00	0.00	0.00	0.00
NA	7	10.57	3.41	5.00	15.00
PB	7	109.00	49.99	29.00	172.00
B	7	495.71	168.63	314.00	839.00
MO	7	0.00	0.00	0.00	0.00
---------- TE=TRANSMISSION TCODE=M88A ----------					
OVHRS	42	470.62	547.31	1.00	2784.00
OILCHR	36	180.00	445.84	1.00	2510.00
FE	79	264.85	154.57	31.00	903.00
AG	70	21.69	15.42	2.00	73.00
AL	79	18.75	21.06	0.00	157.00
CR	79	2.86	3.43	0.00	21.00
CU	79	513.51	296.94	14.00	998.00
SI	79	59.56	36.74	11.00	251.00
SN	79	18.81	13.67	0.00	81.00
NI	79	1.10	1.98	0.00	10.00
NA	79	19.48	29.54	4.00	252.00
PB	79	90.73	43.81	5.00	224.00
B	79	364.77	269.42	11.00	998.00
MO	79	3.76	5.30	0.00	26.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=TRANSMISSION TCODE=M973					
OVHRS	1	7.00	.	7.00	7.00
OILCHR	1	7.00	.	7.00	7.00
FE	3	30.00	4.00	26.00	34.00
AG	0	.	.	.	.
AL	3	20.33	0.58	20.00	21.00
CR	3	0.00	0.00	0.00	0.00
CU	3	38.67	6.51	32.00	45.00
SI	3	28.67	7.77	20.00	35.00
SN	3	2.67	2.52	0.00	5.00
NI	3	0.00	0.00	0.00	0.00
NA	3	8.67	1.15	8.00	10.00
PB	3	172.33	21.22	155.00	196.00
B	3	536.67	72.89	457.00	600.00
MO	3	1.33	1.15	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M106	----------	
OVHRS	73	235.74	191.11	2.00	1091.00
OILCHNG	69	80.46	94.86	1.00	377.00
FE	147	138.20	111.74	6.00	998.00
AG	147	0.03	0.30	0.00	3.00
AL	147	6.07	8.26	0.00	72.00
CR	147	6.12	7.40	0.00	61.00
CU	142	16.11	14.70	2.00	129.00
SI	147	24.75	28.43	4.00	241.00
SN	147	11.97	15.76	0.00	133.00
NI	147	0.04	0.37	0.00	4.00
NA	147	22.66	50.77	0.00	600.00
PB	143	22.03	45.98	2.00	499.00
B	147	231.76	258.07	4.00	998.00
MO	147	0.01	0.16	0.00	2.00
----------		TE=ENGINE	TCODE=M109	----------	
OVHRS	14	577.57	471.91	12.00	1468.00
OILCHNG	8	59.63	28.75	3.00	90.00
FE	74	122.64	95.28	6.00	449.00
AG	74	0.00	0.00	0.00	0.00
AL	74	9.16	14.42	0.00	81.00
CR	74	22.95	30.29	0.00	137.00
CU	73	65.49	108.19	5.00	547.00
SI	74	37.86	42.65	4.00	265.00
SN	74	16.72	15.14	0.00	75.00
NI	74	0.03	0.23	0.00	2.00
NA	74	33.97	45.45	0.00	200.00
PB	73	17.84	10.95	3.00	54.00
B	74	157.42	171.76	3.00	629.00
MO	74	0.03	0.23	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=ENGINE TCODE=M113					
OVHHRS	433	281.63	275.05	1.00	1371.00
OILCHHR	390	96.93	114.77	1.00	924.00
FE	796	126.65	83.76	4.00	777.00
AG	796	0.00	0.11	0.00	3.00
AL	796	4.64	5.18	0.00	45.00
CR	796	4.34	3.18	0.00	18.00
CU	770	17.85	28.78	2.00	401.00
SI	796	18.87	17.32	0.00	392.00
SN	796	12.12	14.84	0.00	103.00
NI	796	0.09	0.84	0.00	13.00
NA	796	56.70	127.08	0.00	998.00
PB	787	23.42	40.80	2.00	643.00
B	796	226.56	231.26	0.00	998.00
MO	796	0.03	0.28	0.00	5.00
TE=ENGINE TCODE=M125					
OVHHRS	0	.	.	.	.
OILCHHR	0	.	.	.	.
FE	2	97.50	12.02	89.00	106.00
AG	2	0.00	0.00	0.00	0.00
AL	2	6.00	0.00	6.00	6.00
CR	2	6.00	0.00	6.00	6.00
CU	2	9.50	2.12	8.00	11.00
SI	2	22.00	4.24	19.00	25.00
SN	2	2.50	3.54	0.00	5.00
NI	2	0.00	0.00	0.00	0.00
NA	2	32.50	13.44	23.00	42.00
PB	2	18.50	10.61	11.00	26.00
B	2	193.00	72.12	142.00	244.00
MO	2	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M185	----------	
OVHHRS	6	244.00	206.89	1.00	442.00
OILCHHR	6	244.00	206.89	1.00	442.00
FE	14	54.86	23.09	21.00	81.00
AG	14	0.00	0.00	0.00	0.00
AL	14	16.43	9.83	5.00	36.00
CR	14	6.79	4.25	0.00	11.00
CU	14	20.00	8.99	6.00	32.00
SI	14	23.79	13.43	9.00	54.00
SN	14	8.57	10.81	0.00	27.00
NI	14	0.29	0.73	0.00	2.00
NA	14	36.50	12.55	14.00	52.00
PB	14	18.57	7.79	6.00	28.00
B	14	111.64	201.21	6.00	583.00
MO	14	0.29	0.73	0.00	2.00
----------		TE=ENGINE	TCODE=M275	----------	
OVHHRS	5	146.60	5.32	143.00	156.00
OILCHHR	5	146.60	5.32	143.00	156.00
FE	11	49.36	28.20	28.00	95.00
AG	11	0.00	0.00	0.00	0.00
AL	11	14.00	6.78	6.00	23.00
CR	11	7.00	5.67	3.00	17.00
CU	11	25.00	10.17	11.00	34.00
SI	11	17.00	3.03	13.00	21.00
SN	11	5.27	2.61	0.00	9.00
NI	11	0.36	0.81	0.00	2.00
NA	11	46.00	21.41	29.00	86.00
PB	11	30.55	15.33	14.00	53.00
B	11	16.64	17.30	4.00	65.00
MO	11	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=ENGINE TCODE=M14A					
OVHRS	0	.	.	.	.
OILCHNR	0	.	.	.	.
FE	1	91.00	.	91.00	91.00
AG	1	0.00	.	0.00	0.00
AL	1	8.00	.	8.00	8.00
CR	1	11.00	.	11.00	11.00
CU	1	13.00	.	13.00	13.00
SI	1	15.00	.	15.00	15.00
SN	1	5.00	.	5.00	5.00
NI	1	0.00	.	0.00	0.00
NA	1	0.00	.	0.00	0.00
PB	1	17.00	.	17.00	17.00
B	1	581.00	.	581.00	581.00
MO	1	0.00	.	0.00	0.00
TE=ENGINE TCODE=M35A					
OVHRS	165	749.72	579.91	1.00	2119.00
OILCHNR	152	264.22	363.77	1.00	1982.00
FE	340	97.93	71.24	9.00	461.00
AG	340	0.00	0.00	0.00	0.00
AL	340	23.09	17.30	0.00	93.00
CR	340	9.82	6.07	0.00	57.00
CU	337	25.06	20.91	2.00	257.00
SI	340	33.06	57.60	5.00	998.00
SN	340	5.09	8.81	0.00	56.00
NI	340	0.78	1.37	0.00	7.00
NA	340	28.77	63.25	0.00	998.00
PB	339	31.45	26.92	3.00	171.00
B	340	159.81	184.13	0.00	998.00
MO	340	0.02	0.19	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M36A	----------	
OVHHRS	7	863.14	630.98	3.00	1750.00
OILCHNG	7	305.43	638.63	3.00	1750.00
FE	19	170.32	110.91	32.00	467.00
AG	19	0.00	0.00	0.00	0.00
AL	19	34.32	16.55	8.00	59.00
CR	19	49.95	56.75	3.00	171.00
CU	19	27.47	11.88	11.00	47.00
SI	19	39.73	18.79	11.00	76.00
SN	19	18.84	13.89	0.00	41.00
NI	19	1.32	1.63	0.00	4.00
NA	19	46.37	38.29	11.00	123.00
PB	19	30.84	14.89	10.00	53.00
B	19	207.63	189.33	3.00	553.00
MO	19	0.00	0.00	0.00	0.00
----------		TE=ENGINE	TCODE=M49A	----------	
OVHHRS	0	.	.	.	.
OILCHNG	0	.	.	.	.
FE	3	69.67	80.41	15.00	162.00
AG	3	0.00	0.00	0.00	0.00
AL	3	15.00	12.49	5.00	29.00
CR	3	5.67	7.37	0.00	14.00
CU	3	9.67	10.02	2.00	21.00
SI	3	20.33	7.02	13.00	27.00
SN	3	0.00	0.00	0.00	0.00
NI	3	0.67	1.15	0.00	2.00
NA	3	10.33	7.57	5.00	19.00
PB	3	12.67	12.42	5.00	27.00
B	3	273.00	180.88	109.00	467.00
MO	3	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
---------- TE=ENGINE			1CODE=M52A	----------	
OVHRS	25	432.56	441.11	15.00	1317.00
OILCHGR	19	229.47	331.72	1.00	1280.00
FE	76	154.45	140.10	3.00	521.00
AG	77	0.03	0.23	0.00	2.00
AL	77	29.86	26.22	0.00	113.00
CR	77	12.23	11.10	0.00	49.00
CU	73	35.37	22.51	5.00	86.00
SI	77	57.16	73.71	0.00	432.00
SN	77	7.78	13.70	0.00	53.00
NI	77	1.12	2.51	0.00	19.00
NA	77	26.94	14.40	0.00	58.00
PB	75	33.65	28.58	4.00	136.00
B	77	105.04	147.88	0.00	691.00
MO	77	8.75	23.88	0.00	86.00
---------- TE=ENGINE			1CODE=M54A	----------	
OVHRS	96	451.53	584.94	11.00	2854.00
OILCHGR	86	75.25	125.77	1.00	528.00
FE	115	124.28	100.77	5.00	447.00
AG	115	0.15	1.59	0.00	17.00
AL	115	31.71	32.48	0.00	235.00
CR	115	13.08	11.39	0.00	66.00
CU	111	27.09	34.98	2.00	295.00
SI	115	50.66	71.54	0.00	469.00
SN	115	10.44	13.01	0.00	48.00
NI	115	0.98	1.50	0.00	7.00
NA	115	40.17	88.52	0.00	803.00
PB	114	36.12	45.97	2.00	346.00
B	115	150.99	166.25	0.00	703.00
MO	115	0.04	0.28	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M543	----------	
OVHRS	16	481.50	587.62	6.00	1938.00
OILCHNG	9	44.00	54.11	3.00	159.00
FE	27	139.19	100.53	27.00	385.00
AG	27	0.15	0.53	0.00	2.00
AL	27	12.70	24.93	2.00	87.00
CR	27	15.04	10.54	0.00	37.00
CU	27	32.00	21.41	7.00	90.00
SI	27	34.15	21.47	11.00	105.00
SN	27	14.44	15.39	0.00	43.00
NI	27	0.52	1.12	0.00	3.00
NA	27	52.41	56.21	12.00	200.00
PB	27	41.26	42.35	11.00	111.00
B	27	82.22	92.73	4.00	324.00
MO	27	0.00	0.00	0.00	0.00

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M548	----------	
OVHRS	36	196.53	333.91	2.00	1295.00
OILCHNG	29	45.03	53.12	2.00	293.00
FE	101	83.98	56.91	5.00	339.00
AG	101	0.05	0.50	0.00	5.00
AL	101	2.77	3.98	0.00	31.00
CR	101	4.07	5.15	0.00	39.00
CU	98	35.04	73.05	2.00	507.00
SI	101	22.07	12.12	7.00	81.00
SN	101	16.43	16.83	0.00	57.00
NI	101	0.19	1.08	0.00	7.00
NA	101	105.54	183.51	5.00	787.00
PB	99	25.75	53.29	2.00	493.00
B	101	161.49	235.58	1.00	999.00
MO	101	0.02	0.20	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=ENGINE TCODE=M561					
OVHHRS	8	46.13	14.12	24.00	68.00
OILCHHR	8	46.13	14.12	24.00	68.00
FE	13	129.15	94.10	59.00	383.00
AG	13	0.00	0.00	0.00	0.00
AL	13	11.15	9.00	0.00	35.00
CR	13	6.85	4.86	3.00	21.00
CU	13	16.00	7.13	8.00	32.00
SI	13	87.38	212.69	17.00	795.00
SN	13	24.62	24.17	5.00	79.00
NI	13	0.00	0.00	0.00	0.00
NA	13	39.31	13.71	15.00	58.00
PB	13	18.85	15.60	7.00	54.00
B	13	293.77	226.89	45.00	749.00
MO	13	0.00	0.00	0.00	0.00
TE=ENGINE TCODE=M577					
OVHHRS	61	371.95	317.69	2.00	1493.00
OILCHHR	61	133.49	183.39	1.00	962.00
FE	110	90.45	57.93	2.00	248.00
AG	110	0.06	0.51	0.00	5.00
AL	110	4.49	4.80	0.00	20.00
CR	110	5.35	7.03	0.00	37.00
CU	103	18.57	21.06	3.00	145.00
SI	110	17.64	10.07	0.00	57.00
SN	110	5.56	7.06	0.00	42.00
NI	110	0.05	0.34	0.00	3.00
NA	110	23.54	33.72	0.00	163.00
PB	104	24.06	41.96	2.00	274.00
B	110	231.15	230.69	6.00	972.00
MO	110	0.03	0.29	0.00	3.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M578	----------	
OVHRS	1	38.00	.	38.00	38.00
OILCHR	1	20.00	.	20.00	20.00
FE	11	104.36	71.96	33.00	249.00
AG	11	0.00	0.00	0.00	0.00
AL	11	4.82	6.13	0.00	21.00
CR	11	9.00	7.72	3.00	24.00
CU	11	29.55	28.55	6.00	97.00
SI	11	30.00	25.59	13.00	102.00
SN	11	13.18	15.63	0.00	54.00
NI	11	0.00	0.00	0.00	0.00
NA	11	31.00	25.96	6.00	96.00
PB	11	19.18	8.16	5.00	30.00
B	11	181.73	192.61	20.00	693.00
MO	11	0.00	0.00	0.00	0.00
----------		TE=ENGINE	TCODE=M60A	----------	
OVHRS	452	255.80	169.64	1.00	1007.00
OILCHR	395	92.30	106.11	1.00	537.00
FE	869	119.39	111.26	3.00	987.00
AG	871	1.83	4.73	0.00	45.00
AL	871	22.11	28.37	0.00	379.00
CR	871	6.45	5.10	0.00	42.00
CU	864	44.89	65.03	3.00	887.00
SI	871	62.74	77.84	0.00	983.00
SN	871	1.91	4.50	0.00	71.00
NI	871	2.47	2.86	0.00	18.00
NA	871	63.08	148.89	0.00	998.00
PB	860	25.03	40.50	2.00	998.00
B	871	308.69	284.24	0.00	998.00
MO	871	1.63	1.88	0.00	14.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
		TE=ENGINE	TCODE=M728		
OVHRS	4	393.75	203.91	209.00	583.00
OILCHNG	3	220.33	314.08	37.00	583.00
FE	5	254.40	177.66	41.00	504.00
AG	5	0.00	0.00	0.00	0.00
AL	5	62.00	48.65	10.00	135.00
CR	5	13.80	7.66	4.00	24.00
CU	5	38.20	12.52	26.00	55.00
SI	5	176.40	127.68	50.00	361.00
SN	5	1.40	2.19	0.00	5.00
NI	5	6.20	4.82	0.00	11.00
NA	5	71.60	72.67	33.00	201.00
PB	5	23.00	6.82	14.00	33.00
B	5	252.80	240.95	86.00	679.00
MO	5	3.40	2.70	0.00	7.00
		TE=ENGINE	TCODE=MH13		
OVHRS	15	1196.13	813.16	28.00	2013.00
OILCHNG	15	446.87	720.45	1.00	1892.00
FE	50	112.54	76.02	5.00	413.00
AG	50	0.00	0.00	0.00	0.00
AL	50	14.52	8.30	0.00	28.00
CR	50	13.08	10.01	0.00	39.00
CU	49	18.62	12.50	2.00	53.00
SI	50	27.88	15.29	5.00	74.00
SN	50	0.06	0.42	0.00	3.00
NI	50	0.54	1.15	0.00	4.00
NA	50	24.90	16.38	3.00	78.00
PB	50	25.70	15.87	3.00	65.00
B	50	77.54	96.05	5.00	578.00
MO	50	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	ICODE=M816	----------	
OVHRS	4	782.25	36.47	735.00	820.00
OILCHGH	4	445.75	44.48	385.00	488.00
FE	5	84.60	15.04	65.00	102.00
AG	5	0.00	0.00	0.00	0.00
AL	5	13.60	4.83	10.00	22.00
CR	5	7.60	1.67	6.00	10.00
CU	5	14.60	3.51	9.00	18.00
SI	5	22.00	8.54	14.00	33.00
SN	5	0.00	0.00	0.00	0.00
NI	5	0.40	0.89	0.00	2.00
NA	5	45.20	12.62	23.00	53.00
PB	5	21.40	4.72	13.00	24.00
B	5	89.60	54.46	21.00	156.00
MO	5	0.00	0.00	0.00	0.00
----------		TE=ENGINE	ICODE=M817	----------	
OVHRS	3	693.33	801.69	193.00	1618.00
OILCHGH	0	.	.	.	.
FE	10	151.70	40.86	102.00	230.00
AG	10	0.00	0.00	0.00	0.00
AL	10	14.50	3.31	9.00	20.00
CR	10	17.50	10.63	6.00	36.00
CU	10	38.50	20.64	19.00	85.00
SI	10	46.80	39.62	25.00	124.00
SN	10	0.50	1.08	0.00	3.00
NI	10	1.00	1.05	0.00	2.00
NA	10	49.80	26.60	21.00	93.00
PB	10	45.10	15.24	22.00	67.00
B	10	101.90	80.34	35.00	271.00
MO	10	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	ICODE=M818	----------	
OVHURS	18	731.61	731.85	1.00	2227.00
OILCHNG	17	710.47	748.68	1.00	2227.00
FE	67	95.21	73.83	5.00	319.00
AG	67	3.31	19.03	0.00	111.00
AL	67	13.76	18.35	0.00	111.00
CR	67	14.25	19.13	0.00	111.00
CU	67	25.94	36.33	3.00	196.00
SI	67	22.37	18.33	6.00	111.00
SN	67	4.03	19.00	0.00	111.00
NI	67	3.69	18.99	0.00	111.00
NA	67	33.43	26.29	3.00	129.00
PB	67	26.42	25.05	2.00	116.00
B	67	113.58	152.73	4.00	857.00
MO	67	3.34	19.03	0.00	111.00
----------		TE=ENGINE	ICODE=M88A	----------	
OVHURS	36	315.47	227.92	5.00	1051.00
OILCHNG	32	158.16	149.38	3.00	571.00
FE	90	158.64	134.03	6.00	717.00
AG	91	2.24	7.13	0.00	43.00
AL	91	24.03	24.73	0.00	179.00
CR	91	14.47	50.10	0.00	362.00
CU	90	80.90	164.11	8.00	857.00
SI	91	57.43	49.75	0.00	366.00
SN	91	2.54	5.92	0.00	31.00
NI	91	3.15	4.04	0.00	25.00
NA	91	80.46	160.83	0.00	801.00
PB	90	40.06	78.21	5.00	675.00
B	91	234.51	253.19	0.00	981.00
MO	91	1.97	1.70	0.00	6.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=ENGINE TCODE=M911					
OVHHRS	4	263.50	47.28	216.00	316.00
OILCHNG	4	148.25	143.99	1.00	316.00
FE	9	57.44	19.84	26.00	79.00
AG	9	0.00	0.00	0.00	0.00
AL	9	9.11	13.69	0.00	33.00
CR	9	5.22	3.11	0.00	8.00
CU	9	47.78	76.28	5.00	182.00
SI	9	16.78	7.05	7.00	29.00
SN	9	2.00	3.12	0.00	8.00
NI	9	0.00	0.00	0.00	0.00
NA	9	40.22	20.97	13.00	58.00
PB	9	13.67	6.04	7.00	24.00
B	9	46.67	27.25	28.00	94.00
MO	9	0.00	0.00	0.00	0.00
TE=ENGINE TCODE=M916					
OVHHRS	2	1444.50	1656.75	273.00	2616.00
OILCHNG	1	174.00	.	174.00	174.00
FE	5	370.20	362.27	151.00	998.00
AG	5	0.00	0.00	0.00	0.00
AL	5	24.60	16.76	9.00	49.00
CR	5	9.80	7.69	0.00	16.00
CU	5	106.20	85.43	9.00	186.00
SI	5	74.60	35.43	48.00	135.00
SN	5	0.00	0.00	0.00	0.00
NI	5	1.20	1.64	0.00	3.00
NA	5	30.00	6.48	23.00	36.00
PB	5	102.40	145.57	8.00	357.00
B	5	186.20	130.22	12.00	355.00
MO	5	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------	----------	TE=ENGINE	TCODE=M973	----------	----------
OVHRS	2	9.00	2.83	7.00	11.00
OILCHNG	2	9.00	2.83	7.00	11.00
FE	5	75.00	46.28	11.00	113.00
AG	5	0.00	0.00	0.00	0.00
AL	5	4.00	3.08	0.00	8.00
CR	5	3.00	2.00	0.00	5.00
CU	5	10.00	6.24	6.00	21.00
SI	5	19.60	4.22	14.00	25.00
SN	5	9.40	14.64	0.00	35.00
NI	5	0.00	0.00	0.00	0.00
NA	5	17.40	10.36	0.00	27.00
PB	5	25.00	30.33	7.00	79.00
V	5	234.00	70.65	162.00	329.00
MO	5	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
---------- TE=TRANSMISSION TCODE=M106 ----------					
OVHHRS	78	296.04	177.56	92.00	1276.00
OILCHHR	77	92.57	95.80	1.00	419.00
FE	145	50.33	42.27	2.00	289.00
AG	9	4.89	3.92	2.00	13.00
AL	147	8.69	6.44	0.00	47.00
CR	147	0.15	0.78	0.00	6.00
CU	146	42.42	59.20	2.00	517.00
SI	147	14.84	18.11	0.00	212.00
SN	147	1.65	3.66	0.00	23.00
NI	147	0.03	0.23	0.00	2.00
NA	147	8.71	11.42	0.00	91.00
PB	147	87.27	85.64	0.00	421.00
B	147	131.16	35.97	17.00	204.00
MO	147	0.12	0.46	0.00	2.00
---------- TE=TRANSMISSION TCODE=M109 ----------					
OVHHRS	3	1155.00	597.56	465.00	1500.00
OILCHHR	0	.	.	.	.
FE	86	79.34	52.24	21.00	279.00
AG	76	7.24	3.99	2.00	20.00
AL	86	4.94	3.75	0.00	15.00
CR	86	1.42	4.94	0.00	34.00
CU	86	158.74	155.32	5.00	671.00
SI	86	16.41	12.20	5.00	77.00
SN	86	2.51	3.50	0.00	15.00
NI	86	0.00	0.00	0.00	0.00
NA	86	9.03	6.70	0.00	37.00
PB	86	32.09	29.80	4.00	137.00
B	86	107.91	40.01	13.00	177.00
MO	86	0.12	0.47	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
---------- TE=TRANSMISSION TCODE=M113 ----------					
OVHRS	393	211.76	192.51	2.00	985.00
OILCHNG	357	76.89	96.76	1.00	925.00
FE	768	43.41	52.59	2.00	977.00
AG	7	6.00	4.65	2.00	14.00
AL	770	8.50	10.24	0.00	123.00
CR	770	0.21	1.28	0.00	21.00
CU	768	34.92	33.66	3.00	517.00
SI	770	18.39	29.14	0.00	627.00
SN	770	1.29	4.09	0.00	63.00
NI	770	0.02	0.29	0.00	5.00
NA	770	28.93	93.18	0.00	998.00
PB	770	68.34	82.81	0.00	591.00
B	770	114.69	67.56	0.00	992.00
MO	770	0.13	0.54	0.00	5.00
---------- TE=TRANSMISSION TCODE=M548 ----------					
OVHRS	22	208.82	399.56	54.00	1480.00
OILCHNG	19	67.16	29.65	3.00	110.00
FE	126	29.92	26.15	9.00	254.00
AG	2	2.50	0.71	2.00	3.00
AL	120	5.38	4.41	0.00	30.00
CR	120	0.27	1.29	0.00	10.00
CU	120	36.52	55.95	5.00	363.00
SI	120	13.29	11.58	5.00	119.00
SN	120	0.92	1.85	0.00	10.00
NI	120	0.00	0.00	0.00	0.00
NA	120	11.36	13.04	3.00	91.00
PB	120	97.22	96.41	0.00	491.00
B	120	112.86	44.86	2.00	221.00
MO	120	0.06	0.37	0.00	3.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
---------- TE=TRANSMISSION TCODE=M577 ----------					
OVHRS	99	332.05	252.76	3.00	1131.00
OILCHG	75	62.84	86.83	1.00	416.00
FE	195	43.11	53.39	3.00	465.00
AG	8	7.63	6.07	3.00	20.00
AL	198	6.20	6.79	0.00	56.00
CR	198	0.68	3.12	0.00	33.00
CU	195	40.71	47.15	3.00	321.00
SI	198	12.91	8.68	0.00	59.00
SN	198	1.95	7.26	0.00	69.00
NI	198	0.03	0.26	0.00	3.00
NA	198	12.52	19.07	0.00	136.00
PB	198	87.12	76.61	0.00	400.00
B	198	112.56	41.06	0.00	229.00
MO	194	0.14	0.54	0.00	3.00
---------- TE=TRANSMISSION TCODE=M578 ----------					
OVHRS	6	29.50	10.65	16.00	44.00
OILCHG	6	26.83	15.16	2.00	44.00
FE	14	42.86	18.32	17.00	99.00
AG	9	4.67	4.36	2.00	16.00
AL	15	3.73	2.43	0.00	8.00
CR	15	0.67	1.91	0.00	7.00
CU	14	147.21	130.44	10.00	543.00
SI	15	16.60	6.95	6.00	26.00
SN	15	1.20	2.34	0.00	7.00
NI	15	0.00	0.00	0.00	0.00
NA	15	13.33	14.52	5.00	59.00
PB	15	38.53	63.38	3.00	261.00
B	15	108.33	58.20	5.00	171.00
MO	15	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
---------- TE=TRANSMISSION TCODE=M60A ----------					
OVHRS	420	312.69	154.77	1.00	1200.00
OILCHR	382	82.21	98.95	1.00	763.00
FE	1045	160.96	106.28	2.00	959.00
AG	949	16.33	13.02	2.00	106.00
AL	1047	7.06	10.55	0.00	153.00
CR	1047	1.84	2.34	0.00	16.00
CU	1042	194.69	134.01	3.00	879.00
SI	1047	26.52	23.74	0.00	243.00
SN	1047	8.35	8.52	0.00	74.00
NI	1047	0.29	0.96	0.00	12.00
NA	1047	13.51	42.74	0.00	801.00
PB	1047	61.40	43.50	0.00	525.00
B	1047	113.73	41.81	0.00	412.00
MO	1047	0.15	0.66	0.00	11.00
---------- TE=TRANSMISSION TCODE=M72A ----------					
OVHRS	4	389.50	161.73	212.00	590.00
OILCHR	2	261.50	245.37	88.00	435.00
FE	17	129.88	101.54	41.00	382.00
AG	13	6.54	5.36	2.00	18.00
AL	17	8.00	17.11	0.00	70.00
CR	17	2.35	3.95	0.00	16.00
CU	17	207.24	180.32	35.00	573.00
SI	17	36.65	47.74	11.00	191.00
SN	17	5.47	6.67	0.00	22.00
NI	17	0.59	1.97	0.00	8.00
NA	17	50.18	142.37	3.00	600.00
PB	17	65.29	50.07	10.00	207.00
B	17	114.29	49.13	20.00	193.00
MO	17	0.18	0.73	0.00	3.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
---------- TE=TRANSMISSION TCODE=M88A ----------					
OVHRS	47	469.11	291.39	34.00	1134.00
OILCHGR	36	79.39	136.79	1.00	830.00
FE	96	201.91	132.14	2.00	660.00
AG	82	11.15	8.59	2.00	41.00
AL	96	11.86	26.17	0.00	249.00
CR	96	1.42	2.21	0.00	9.00
CU	96	265.00	157.19	2.00	753.00
SI	96	46.04	36.29	3.00	309.00
SN	96	10.54	9.00	0.00	57.00
NI	96	0.60	1.24	0.00	5.00
NA	96	29.53	92.42	0.00	543.00
PB	96	72.49	46.15	2.00	293.00
V	96	92.42	37.03	11.00	166.00
MO	96	2.00	6.23	0.00	54.00
---------- TE=TRANSMISSION TCODE=M973 ----------					
OVHRS	0	.	.	.	.
OILCHGR	0	.	.	.	.
FE	2	50.00	11.31	42.00	58.00
AG	0	.	.	.	.
AL	2	8.00	4.24	5.00	11.00
CR	2	0.00	0.00	0.00	0.00
CU	2	60.00	41.01	31.00	89.00
SI	2	8.00	1.41	7.00	9.00
SN	2	1.50	2.12	0.00	3.00
NI	2	0.00	0.00	0.00	0.00
NA	2	5.50	0.71	5.00	6.00
PB	2	47.00	1.41	46.00	48.00
V	2	141.00	16.97	129.00	153.00
MO	2	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
		TE=ENGINE	TCODE=M-3		
OVHRS	49	351.76	143.74	51.00	695.00
OILCHR	49	329.71	150.82	2.00	548.00
FE	70	61.14	35.24	3.00	187.00
AG	70	0.40	0.98	0.00	7.00
AL	70	11.23	4.78	0.00	25.00
CR	70	21.90	12.91	0.00	54.00
CU	69	19.46	34.11	1.00	282.00
SI	70	17.30	9.58	4.00	44.00
SN	70	5.10	4.56	0.00	17.00
NI	70	1.47	1.65	0.00	13.00
MA	70	31.04	22.61	5.00	126.00
PB	70	16.03	17.71	2.00	135.00
B	70	76.53	75.31	7.00	413.00
MO	70	0.87	0.90	0.00	3.00
		TE=ENGINE	TCODE=M106		
OVHRS	41	110.29	28.95	37.00	159.00
OILCHR	41	106.76	31.82	12.00	159.00
FE	46	99.83	27.51	54.00	163.00
AG	46	0.43	0.54	0.00	2.00
AL	46	6.35	1.79	0.00	13.00
CR	46	4.26	3.04	1.00	22.00
CU	46	17.63	14.44	7.00	90.00
SI	46	15.54	5.70	6.00	35.00
SN	46	11.11	5.48	0.00	24.00
NI	46	0.89	1.16	0.00	8.00
MA	46	28.07	9.71	6.00	47.00
PB	46	21.87	49.73	2.00	350.00
B	46	94.33	61.69	16.00	360.00
MO	46	0.67	0.67	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
		TE=ENGINE	TCODE=M113		
OVHRS	128	298.30	301.34	4.00	1174.00
OILCHGS	121	218.99	287.43	1.00	1174.00
FE	161	91.95	59.92	1.00	310.00
AG	161	0.34	0.48	0.00	1.00
AL	161	8.29	12.03	0.00	154.00
CR	161	6.70	11.92	0.00	80.00
CU	160	23.66	34.32	1.00	243.00
SI	161	29.27	58.83	0.00	630.00
SN	161	18.59	41.02	0.00	336.00
NI	161	1.07	1.57	0.00	13.00
NA	161	26.52	16.56	0.00	111.00
PB	161	22.80	40.27	2.00	421.00
B	161	79.45	69.08	0.00	376.00
MO	161	0.69	0.67	0.00	4.00
		TE=ENGINE	TCODE=M35A		
OVHRS	59	921.07	675.70	1.00	2952.00
OILCHGS	52	507.42	371.90	1.00	1204.00
FE	74	133.50	112.03	8.00	597.00
AG	74	0.24	0.49	0.00	2.00
AL	74	28.31	29.71	5.00	191.00
CR	74	10.30	7.15	1.00	35.00
CU	74	46.74	83.88	1.00	587.00
SI	74	58.91	99.80	2.00	583.00
SN	74	9.41	9.28	0.00	42.00
NI	74	2.70	2.68	0.00	18.00
NA	74	90.92	133.09	9.00	541.00
PB	74	41.26	37.37	2.00	179.00
B	74	126.58	223.12	6.00	998.00
MO	74	0.97	1.25	0.00	8.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
		TE=ENGINE	TCODE=M49A		
OVHRS	6	958.67	322.22	583.00	1368.00
OILCHR	6	218.17	140.63	54.00	415.00
FE	7	141.00	44.19	63.00	187.00
AG	7	0.00	0.00	0.00	0.00
AL	7	27.57	11.82	4.00	39.00
CR	7	12.57	3.21	8.00	17.00
CU	7	26.71	14.60	11.00	50.00
SI	7	40.43	14.41	22.00	61.00
SN	7	9.86	11.51	0.00	31.00
NI	7	1.86	1.07	0.00	3.00
NA	7	36.14	6.94	21.00	41.00
PB	7	43.43	26.79	18.00	98.00
B	7	28.57	23.60	5.00	74.00
MO	7	0.57	0.79	0.00	2.00
		TE=ENGINE	TCODE=M50A		
OVHRS	2	234.50	21.92	219.00	250.00
OILCHR	2	110.00	154.15	1.00	219.00
FE	2	108.50	108.19	32.00	185.00
AG	2	0.00	0.00	0.00	0.00
AL	2	13.00	8.49	7.00	19.00
CR	2	8.50	7.78	3.00	14.00
CU	2	44.50	44.55	13.00	76.00
SI	2	20.00	18.38	7.00	33.00
SN	2	20.00	15.56	9.00	31.00
NI	2	2.50	2.12	1.00	4.00
NA	2	22.00	21.21	7.00	37.00
PB	2	42.00	41.01	13.00	71.00
B	2	41.00	35.36	16.00	66.00
MO	2	1.50	0.71	1.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
		TE=ENGINE	TCODE=M52A		
OVHRS	4	792.00	43.34	753.00	854.00
OILCHNG	4	257.25	398.05	40.00	854.00
FE	4	137.00	76.95	71.00	242.00
AG	4	0.00	0.00	0.00	0.00
AL	4	30.00	20.28	13.00	55.00
CR	4	16.00	8.16	6.00	26.00
CU	4	67.25	50.85	21.00	133.00
SI	4	151.50	147.49	18.00	349.00
SN	4	31.50	23.07	14.00	65.00
NI	4	4.00	4.76	1.00	11.00
NA	4	36.50	7.33	26.00	42.00
PB	4	77.25	81.25	5.00	175.00
B	4	40.25	24.76	23.00	77.00
MO	4	0.50	0.58	0.00	1.00
		TE=ENGINE	TCODE=M54A		
OVHRS	20	588.95	588.62	51.00	1896.00
OILCHNG	19	222.79	187.51	21.00	879.00
FE	25	122.44	75.44	9.00	312.00
AG	25	0.56	1.33	0.00	4.00
AL	25	22.32	13.70	5.00	55.00
CR	25	14.60	8.26	3.00	33.00
CU	25	60.88	82.63	2.00	352.00
SI	25	36.44	22.02	8.00	97.00
SN	25	11.48	9.71	0.00	37.00
NI	25	3.20	3.51	0.00	13.00
NA	25	75.08	118.29	10.00	564.00
PB	25	59.52	35.60	5.00	118.00
B	25	106.48	196.70	5.00	998.00
MO	25	1.08	1.22	0.00	4.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M551	----------	
OVHHRS	60	192.33	216.52	7.00	860.00
OILCHHR	60	181.77	222.01	1.00	860.00
FE	102	169.89	169.37	5.00	926.00
AG	103	0.34	0.50	0.00	2.00
AL	103	13.50	13.85	0.00	93.00
CR	103	23.63	30.10	0.00	156.00
CU	102	16.07	15.90	1.00	111.00
SI	103	44.64	66.89	0.00	503.00
SN	103	18.14	25.04	0.00	156.00
NI	103	1.18	1.94	0.00	13.00
MA	103	27.43	22.73	0.00	161.00
PB	102	15.93	15.34	1.00	108.00
B	103	62.42	67.89	0.00	287.00
MO	103	0.44	0.62	0.00	3.00
----------		TE=ENGINE	TCODE=M561	----------	
OVHHRS	8	1051.88	53.49	1000.00	1143.00
OILCHHR	7	318.29	78.26	259.00	466.00
FE	15	164.20	118.10	35.00	452.00
AG	15	0.27	0.46	0.00	1.00
AL	15	15.33	6.98	5.00	29.00
CR	15	12.07	6.13	3.00	22.00
CU	15	60.93	109.51	3.00	376.00
SI	15	45.07	30.23	7.00	114.00
SN	15	21.13	17.69	0.00	59.00
NI	15	2.40	3.70	0.00	11.00
MA	15	72.13	115.29	3.00	364.00
PB	15	57.27	90.86	4.00	296.00
B	15	209.80	329.78	16.00	998.00
MO	15	0.53	0.64	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
		TE=ENGINE	TCODE=M577		
OVHHRS	17	693.71	407.95	121.00	1380.00
OILCHHR	17	354.00	333.80	9.00	927.00
FE	19	77.37	41.99	16.00	180.00
AG	20	0.45	0.60	0.00	2.00
AL	20	6.10	2.61	0.00	9.00
CR	20	4.05	3.09	0.00	10.00
CU	19	16.47	17.89	5.00	85.00
SI	20	18.00	10.12	0.00	45.00
SN	20	9.40	9.66	0.00	32.00
NI	20	1.85	3.36	0.00	13.00
NA	20	40.40	57.02	0.00	237.00
PB	19	20.32	33.17	6.00	156.00
B	20	82.15	87.62	0.00	390.00
MO	20	0.60	0.60	0.00	2.00
		TE=ENGINE	TCODE=M60A		
OVHHRS	194	193.21	153.49	4.00	639.00
OILCHHR	193	90.80	103.18	1.00	557.00
FE	236	174.93	147.92	4.00	946.00
AG	236	10.34	73.27	0.00	985.00
AL	236	26.23	54.38	5.00	654.00
CR	236	14.62	55.90	1.00	659.00
CU	236	79.96	103.08	1.00	879.00
SI	236	58.92	41.81	4.00	373.00
SN	236	7.77	32.78	0.00	496.00
NI	236	8.65	45.60	0.00	549.00
NA	236	54.53	89.33	1.00	655.00
PB	236	47.68	52.23	5.00	564.00
B	236	43.35	60.90	0.00	564.00
MO	236	10.81	72.85	0.00	748.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
		TE=ENGINE	TCODE=M813		
OVHHRS	6	1510.67	205.05	1280.00	1875.00
OILCHGR	3	1126.00	613.47	427.00	1575.00
FE	9	99.44	72.73	15.00	266.00
AG	9	0.00	0.00	0.00	0.00
AL	9	11.89	3.10	8.00	18.00
CR	9	22.11	15.41	2.00	50.00
CU	9	12.33	5.24	2.00	18.00
SI	9	23.00	10.09	13.00	48.00
SN	9	2.11	3.26	0.00	8.00
NI	9	0.78	0.67	0.00	2.00
NA	9	26.78	11.91	5.00	38.00
PB	9	20.00	7.37	5.00	25.00
B	9	118.11	78.27	38.00	294.00
MO	9	0.78	0.83	0.00	2.00
		TE=ENGINE	TCODE=M816		
OVHHRS	2	1785.50	256.68	1604.00	1967.00
OILCHGR	1	583.00	.	583.00	583.00
FE	2	81.50	4.95	78.00	85.00
AG	2	0.00	0.00	0.00	0.00
AL	2	10.00	1.41	9.00	11.00
CR	2	23.50	3.54	21.00	26.00
CU	2	36.50	34.65	12.00	61.00
SI	2	30.00	25.46	12.00	48.00
SN	2	3.50	4.95	0.00	7.00
NI	2	0.50	0.71	0.00	1.00
NA	2	29.50	16.26	18.00	41.00
PB	2	46.50	24.75	29.00	64.00
B	2	48.00	19.80	34.00	62.00
MO	2	1.00	0.00	1.00	1.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
		TE=ENGINE	TCODE=M88A		
OVHHRS	22	275.27	251.59	10.00	728.00
OILCHHR	22	174.86	202.50	10.00	650.00
FE	25	141.40	97.66	38.00	387.00
AG	25	0.40	0.76	0.00	3.00
AL	25	19.64	7.57	8.00	40.00
CR	25	12.76	5.55	4.00	24.00
CU	25	38.24	16.24	10.00	67.00
SI	25	53.04	20.62	15.00	99.00
SN	25	4.08	3.66	0.00	9.00
NI	25	5.28	3.73	1.00	18.00
NA	25	30.32	11.08	12.00	45.00
PB	25	28.24	16.31	8.00	69.00
B	25	28.36	27.61	4.00	87.00
MO	25	3.40	2.02	0.00	9.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=TRANSMISSION TCODE=M-3					
OVHRS	40	394.72	303.18	2.00	1206.00
OILCHNG	37	169.43	219.01	1.00	641.00
FE	86	87.57	57.32	9.00	310.00
AG	19	2.16	1.17	1.00	5.00
AL	86	19.80	12.17	0.00	78.00
CR	86	0.65	3.07	0.00	28.00
CU	86	105.90	77.12	14.00	355.00
SI	86	29.86	26.57	4.00	189.00
SN	86	0.34	1.52	0.00	10.00
NI	86	0.24	1.32	0.00	12.00
NA	86	14.40	9.11	0.00	53.00
PB	86	19.36	20.13	4.00	120.00
B	86	153.15	219.85	4.00	998.00
MO	86	0.94	1.67	0.00	6.00
TE=TRANSMISSION TCODE=M106					
OVHRS	21	192.81	36.30	131.00	293.00
OILCHNG	21	42.81	49.66	1.00	176.00
FE	21	60.62	57.11	10.00	250.00
AG	10	3.70	2.16	1.00	9.00
AL	21	11.05	7.03	0.00	27.00
CR	21	0.29	0.46	0.00	1.00
CU	21	91.00	93.39	7.00	368.00
SI	21	46.52	88.10	9.00	405.00
SN	21	2.19	3.03	0.00	8.00
NI	21	0.05	0.22	0.00	1.00
NA	21	18.19	13.75	4.00	48.00
PB	21	205.00	162.40	5.00	553.00
B	21	295.38	265.78	5.00	722.00
MO	21	0.24	0.54	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
---------- TE=TRANSMISSION TCODE=M113 ----------					
OVHHRS	17	362.82	207.35	30.00	641.00
OILCHHR	17	110.24	118.18	28.00	483.00
FE	18	65.39	51.05	16.00	212.00
AG	1	1.00	.	1.00	1.00
AL	18	15.78	8.34	0.00	32.00
CR	18	0.22	0.43	0.00	1.00
CU	18	83.50	66.94	20.00	257.00
SI	18	15.33	6.64	5.00	32.00
SN	18	1.89	3.77	0.00	12.00
NI	18	0.67	2.59	0.00	11.00
NA	18	22.78	21.72	7.00	96.00
PB	18	174.72	109.87	66.00	482.00
B	18	277.28	220.12	49.00	590.00
MO	18	0.22	0.43	0.00	1.00
---------- TE=TRANSMISSION TCODE=M551 ----------					
OVHHRS	42	278.90	244.08	1.00	816.00
OILCHHR	41	159.90	170.52	1.00	542.00
FE	52	32.19	19.72	7.00	77.00
AG	1	1.00	.	1.00	1.00
AL	52	9.17	5.58	0.00	25.00
CR	52	0.15	0.36	0.00	1.00
CU	52	76.96	54.70	16.00	249.00
SI	52	46.10	86.79	8.00	467.00
SN	52	0.65	1.82	0.00	7.00
NI	52	0.10	0.30	0.00	1.00
NA	52	11.48	6.54	3.00	38.00
PB	52	12.81	7.24	3.00	35.00
B	52	306.60	248.80	20.00	738.00
MO	52	0.12	0.32	0.00	1.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=TRANSMISSION TCODE=M577					
OVHRS	9	143.11	126.66	37.00	455.00
OILCHG	9	22.44	19.98	1.00	51.00
FE	10	79.20	52.21	21.00	175.00
AG	1	1.00	.	1.00	1.00
AL	10	12.90	7.22	4.00	26.00
CR	10	0.50	0.97	0.00	3.00
CU	10	57.90	44.81	9.00	134.00
SI	10	32.20	26.64	8.00	85.00
SN	10	1.00	2.16	0.00	6.00
NI	10	0.00	0.00	0.00	0.00
NA	10	16.70	16.20	5.00	48.00
PB	10	159.00	134.07	2.00	391.00
B	10	280.10	249.15	24.00	760.00
MO	10	0.20	0.63	0.00	2.00
TE=TRANSMISSION TCODE=M60A					
OVHRS	248	234.83	165.06	4.00	789.00
OILCHG	243	47.13	60.06	1.00	529.00
FE	306	252.24	187.82	22.00	998.00
AG	253	8.65	6.12	1.00	41.00
AL	306	12.08	17.64	0.00	288.00
CR	306	2.75	3.70	0.00	38.00
CU	305	189.12	137.67	12.00	943.00
SI	306	51.68	69.77	8.00	811.00
SN	306	6.12	11.03	0.00	106.00
NI	306	0.63	1.72	0.00	13.00
NA	306	13.05	17.89	3.00	248.00
PB	306	70.54	47.37	7.00	287.00
B	306	251.87	218.38	3.00	998.00
MO	306	0.27	0.81	0.00	5.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=TRANSMISSION TCODE=M88A					
OVHHRS	20	169.40	184.46	1.00	569.00
OILCHHR	20	45.65	47.01	1.00	175.00
FE	24	286.83	172.88	47.00	659.00
AG	23	18.65	14.29	2.00	61.00
AL	25	9.40	9.42	0.00	42.00
CR	25	1.00	1.47	0.00	5.00
CU	24	340.33	121.70	59.00	585.00
SI	25	59.52	34.59	15.00	145.00
SN	25	13.16	11.09	0.00	48.00
NI	25	0.24	0.72	0.00	3.00
NA	25	149.44	300.04	0.00	998.00
PB	25	99.32	51.00	0.00	197.00
B	25	155.64	163.94	4.00	604.00
MO	25	0.24	0.72	0.00	3.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
		TE=ENGINE TCODE=M-3			
OVHHRS	39	469.18	290.37	9.00	1371.00
OILCHHR	36	81.94	106.92	1.00	389.00
FE	87	47.08	32.38	3.00	206.00
AG	87	0.01	0.11	0.00	1.00
AL	87	9.28	5.73	0.00	29.00
CR	87	15.55	10.11	0.00	56.00
CU	78	8.23	6.61	1.00	31.00
SI	87	14.48	8.43	3.00	47.00
SN	87	0.47	2.92	0.00	25.00
NI	87	0.39	1.70	0.00	15.00
MA	87	18.17	15.44	0.00	95.00
PB	86	8.03	5.80	1.00	39.00
B	87	207.10	209.26	9.00	757.00
MO	87	0.14	0.44	0.00	2.00
		TE=ENGINE TCODE=M106			
OVHHRS	23	177.39	43.13	127.00	293.00
OILCHHR	21	40.57	44.03	1.00	176.00
FE	24	51.17	42.75	6.00	176.00
AG	25	0.24	0.83	0.00	3.00
AL	25	2.36	3.51	0.00	10.00
CR	25	1.44	2.18	0.00	6.00
CU	23	21.83	26.80	3.00	106.00
SI	25	9.84	3.80	5.00	19.00
SN	25	2.60	4.56	0.00	17.00
NI	25	0.04	0.20	0.00	1.00
MA	25	31.24	58.60	2.00	251.00
PB	24	27.38	72.60	2.00	290.00
B	25	321.36	325.73	27.00	998.00
MO	25	0.16	0.55	0.00	2.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M113	----------	
OVHHRS	67	365.51	325.31	7.00	1300.00
OILCHHR	67	90.37	131.24	1.00	860.00
FE	79	53.54	44.14	3.00	292.00
AG	79	0.00	0.00	0.00	0.00
AL	79	3.76	4.22	0.00	29.00
CR	79	2.09	7.45	0.00	64.00
CU	69	10.62	11.92	2.00	65.00
SI	79	13.96	11.40	4.00	102.00
SN	79	5.62	9.01	0.00	33.00
NI	79	0.06	0.25	0.00	1.00
NA	79	20.42	24.44	2.00	118.00
PB	75	11.48	24.95	1.00	216.00
B	79	329.97	243.64	61.00	729.00
MO	79	0.11	0.36	0.00	2.00
----------		TE=ENGINE	TCODE=M35A	----------	
OVHHRS	48	1147.90	643.92	71.00	2535.00
OILCHHR	46	205.83	339.39	1.00	1333.00
FE	56	69.71	46.54	5.00	249.00
AG	56	0.00	0.00	0.00	0.00
AL	56	14.96	10.40	0.00	47.00
CR	56	5.86	5.72	0.00	30.00
CU	53	44.26	88.63	1.00	402.00
SI	56	23.88	19.57	8.00	122.00
SN	56	3.50	7.52	0.00	43.00
NI	56	0.89	2.29	0.00	11.00
NA	56	85.11	188.61	0.00	975.00
PB	55	39.55	66.88	2.00	355.00
B	56	308.93	307.44	9.00	998.00
MO	56	0.09	0.44	0.00	3.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
----------		TE=ENGINE	TCODE=M49A	----------	
OVHHRS	7	991.43	531.26	116.00	1707.00
OILCHHR	5	60.40	74.65	1.00	185.00
FE	10	64.80	58.96	7.00	207.00
AG	10	0.00	0.00	0.00	0.00
AL	10	15.80	16.67	0.00	57.00
CR	10	4.90	5.15	0.00	15.00
CU	10	44.20	69.34	8.00	237.00
SI	10	22.20	17.60	7.00	61.00
SN	10	2.30	4.66	0.00	12.00
NI	10	0.40	0.97	0.00	3.00
NA	10	74.80	92.31	8.00	293.00
PB	10	26.20	29.00	4.00	99.00
B	10	342.40	328.02	37.00	998.00
MO	10	0.20	0.63	0.00	2.00
----------		TE=ENGINE	TCODE=M52A	----------	
OVHHRS	3	350.67	526.85	42.00	959.00
OILCHHR	2	47.00	53.74	9.00	85.00
FE	3	83.00	52.60	41.00	142.00
AG	3	0.00	0.00	0.00	0.00
AL	3	14.33	2.52	12.00	17.00
CR	3	13.33	16.20	3.00	32.00
CU	3	34.33	10.02	24.00	44.00
SI	3	19.00	3.61	15.00	22.00
SN	3	4.33	7.51	0.00	13.00
NI	3	0.00	0.00	0.00	0.00
NA	3	34.00	5.57	28.00	39.00
PB	3	22.33	5.03	17.00	27.00
B	3	99.33	117.58	27.00	235.00
MO	3	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
		TE=ENGINE	TCODE=M54A		
OVHHRS	13	363.31	302.11	50.00	908.00
OILCHHR	11	114.36	159.86	1.00	477.00
FE	16	69.56	56.10	14.00	226.00
AG	16	0.00	0.00	0.00	0.00
AL	16	19.69	18.69	3.00	70.00
CR	16	11.44	14.23	0.00	55.00
CU	15	13.60	8.51	4.00	32.00
SI	16	8.50	30.48	4.00	134.00
SN	16	3.50	4.18	0.00	12.00
NI	16	0.38	1.02	0.00	4.00
NA	16	13.13	7.55	4.00	25.00
PB	16	24.50	20.80	9.00	89.00
B	16	236.25	221.52	50.00	743.00
MO	16	0.19	0.54	0.00	2.00
		TE=ENGINE	TCODE=M551		
OVHHRS	55	323.27	246.13	5.00	891.00
OILCHHR	53	202.21	150.73	1.00	652.00
FE	74	129.34	190.30	4.00	998.00
AG	75	0.00	0.00	0.00	0.00
AL	75	9.43	15.11	0.00	121.00
CR	75	9.45	18.65	0.00	121.00
CU	58	13.74	29.65	2.00	220.00
SI	75	31.23	74.57	7.00	632.00
SN	75	7.12	18.22	0.00	136.00
NI	75	0.13	0.55	0.00	4.00
NA	75	16.85	17.14	0.00	102.00
PB	71	8.04	6.59	2.00	34.00
B	75	316.11	285.61	56.00	998.00
MO	75	0.08	0.27	0.00	1.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
		TE=ENGINE	TCODE=M577		
OVHHRS	13	242.85	278.65	47.00	996.00
OILCHNG	12	136.33	301.64	1.00	996.00
FE	15	36.73	26.92	7.00	101.00
AG	15	0.00	0.00	0.00	0.00
AL	15	2.80	2.34	0.00	7.00
CR	15	1.40	2.29	0.00	7.00
CU	13	5.46	3.38	2.00	14.00
SI	15	12.07	4.93	6.00	25.00
SN	15	2.20	6.01	0.00	23.00
NI	15	0.00	0.00	0.00	0.00
NA	15	16.93	25.59	4.00	103.00
PB	14	5.43	2.93	2.00	11.00
B	15	333.67	257.36	73.00	649.00
MO	15	0.13	0.35	0.00	1.00
		TE=ENGINE	TCODE=M60A		
OVHHRS	204	212.90	166.61	4.00	791.00
OILCHNG	203	52.38	69.85	1.00	697.00
FE	244	113.65	118.74	13.00	998.00
AG	244	1.32	2.79	0.00	21.00
AL	244	16.41	14.07	2.00	114.00
CR	244	4.91	4.88	0.00	37.00
CU	244	37.44	49.88	4.00	351.00
SI	244	52.82	63.38	13.00	501.00
SN	244	0.37	1.83	0.00	19.00
NI	244	1.16	2.26	0.00	17.00
NA	244	37.16	70.31	4.00	620.00
PB	244	20.52	19.94	3.00	139.00
B	244	224.71	190.76	15.00	786.00
MO	244	0.91	1.60	0.00	9.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=ENGINE TCODE=M813					
OVHHRS	6	1077.00	764.17	77.00	1709.00
OILCHHR	5	108.40	78.05	50.00	238.00
FE	6	42.33	42.88	14.00	128.00
AG	6	0.00	0.00	0.00	0.00
AL	6	9.17	5.46	5.00	20.00
CR	6	4.00	3.03	0.00	8.00
CU	5	8.20	11.14	2.00	28.00
SI	6	16.83	14.93	7.00	47.00
SN	6	1.17	2.86	0.00	7.00
NI	6	0.00	0.00	0.00	0.00
NA	6	8.00	5.02	3.00	16.00
PB	6	10.50	12.41	2.00	35.00
B	6	270.17	284.43	55.00	670.00
MO	6	0.50	0.84	0.00	2.00
TE=ENGINE TCODE=M816					
OVHHRS	3	709.33	1115.15	65.00	1997.00
OILCHHR	2	33.00	45.25	1.00	65.00
FE	3	65.00	83.35	11.00	161.00
AG	3	0.00	0.00	0.00	0.00
AL	3	6.67	6.11	0.00	12.00
CR	3	7.00	9.64	0.00	18.00
CU	2	15.00	8.49	9.00	21.00
SI	3	21.00	8.89	14.00	31.00
SN	3	0.00	0.00	0.00	0.00
NI	3	0.00	0.00	0.00	0.00
NA	3	9.00	7.81	4.00	18.00
PB	3	22.00	24.33	6.00	50.00
B	3	309.33	429.84	18.00	803.00
MO	3	0.00	0.00	0.00	0.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
		TE=ENGINE	TCODE=M88A		
OVHHRS	20	241.60	295.35	1.00	727.00
OILCHGS	20	38.95	45.92	1.00	175.00
FE	25	74.24	64.01	15.00	267.00
AG	26	0.00	0.00	0.00	0.00
AL	26	12.19	7.14	0.00	28.00
CR	26	5.42	3.16	0.00	11.00
CU	25	22.28	10.36	7.00	46.00
SI	26	38.38	16.53	15.00	72.00
SN	26	0.00	0.00	0.00	0.00
NI	26	0.96	1.73	0.00	6.00
NA	26	200.88	297.30	2.00	998.00
PB	25	16.44	7.73	6.00	34.00
B	26	198.92	216.09	0.00	641.00
MO	26	0.58	1.03	0.00	3.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=TRANSMISSION TCODE=M-3					
OVHHRS	42	362.43	133.68	1.00	640.00
OILCHHR	41	371.24	122.36	51.00	640.00
FE	60	82.32	46.23	16.00	201.00
AG	43	1.74	1.09	1.00	5.00
AL	60	16.77	6.85	7.00	33.00
CR	60	2.52	5.17	0.00	32.00
CU	60	114.92	88.75	10.00	386.00
SI	60	27.72	18.45	5.00	72.00
SN	60	4.03	4.28	0.00	12.00
NI	60	0.87	1.56	0.00	12.00
NA	60	13.17	5.81	7.00	38.00
PB	60	22.55	23.64	3.00	107.00
B	60	155.38	178.64	4.00	590.00
MO	60	2.30	2.09	0.00	7.00
TE=TRANSMISSION TCODE=M106					
OVHHRS	37	113.22	31.02	11.00	159.00
OILCHHR	37	102.32	40.68	1.00	159.00
FE	43	61.28	25.12	10.00	120.00
AG	40	4.17	2.45	1.00	10.00
AL	43	11.98	2.51	5.00	16.00
CR	43	1.42	3.05	0.00	19.00
CU	43	118.79	52.54	3.00	298.00
SI	43	24.47	9.78	5.00	48.00
SN	43	3.88	3.57	0.00	11.00
NI	43	1.37	2.09	0.00	10.00
NA	43	31.51	15.95	3.00	51.00
PB	43	358.60	157.00	9.00	531.00
B	43	113.60	124.69	5.00	486.00
MO	43	0.91	0.72	0.00	3.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=TRANSMISSION TCODE=M113					
OVHHRS	30	214.87	183.59	6.00	674.00
OILCHNG	30	202.30	184.03	6.00	674.00
FE	31	73.26	44.40	16.00	206.00
AG	20	1.25	0.44	1.00	2.00
AL	31	15.39	8.47	4.00	34.00
CR	31	0.65	0.71	0.00	3.00
CU	31	113.97	73.90	9.00	300.00
SI	31	18.74	8.37	3.00	38.00
SN	31	8.13	6.34	0.00	24.00
NI	31	1.35	2.23	0.00	10.00
NA	31	21.87	21.52	5.00	89.00
PB	31	227.48	158.77	18.00	471.00
B	31	290.16	176.96	5.00	567.00
MO	31	1.39	0.80	0.00	3.00
TE=TRANSMISSION TCODE=M548					
OVHHRS	1	3.00	.	3.00	3.00
OILCHNG	1	3.00	.	3.00	3.00
FE	1	13.00	.	13.00	13.00
AG	0	.	.	.	.
AL	1	0.00	.	0.00	0.00
CR	1	1.00	.	1.00	1.00
CU	1	10.00	.	10.00	10.00
SI	1	7.00	.	7.00	7.00
SN	1	7.00	.	7.00	7.00
NI	1	1.00	.	1.00	1.00
NA	1	11.00	.	11.00	11.00
PB	1	10.00	.	10.00	10.00
B	1	12.00	.	12.00	12.00
MO	1	1.00	.	1.00	1.00

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VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
---------- TE=TRANSMISSION TCODE=M551 ----------					
OVHHRS	44	206.11	223.59	1.00	860.00
OILCHNG	43	201.37	227.06	1.00	860.00
FE	76	60.62	45.64	6.00	194.00
AG	45	1.78	0.95	1.00	5.00
AL	76	13.13	7.65	2.00	42.00
CR	76	1.47	2.01	0.00	16.00
CU	76	183.30	152.96	1.00	782.00
SI	76	25.25	35.81	4.00	248.00
SN	76	5.37	5.38	0.00	23.00
NI	76	0.97	1.58	0.00	11.00
NA	76	32.46	24.06	3.00	88.00
PB	76	34.30	25.40	2.00	130.00
B	76	85.20	96.63	1.00	396.00
MO	76	1.01	0.86	0.00	3.00
---------- TE=TRANSMISSION TCODE=M577 ----------					
OVHHRS	12	481.17	325.00	121.00	927.00
OILCHNG	12	346.75	281.03	24.00	927.00
FE	15	76.67	37.46	15.00	130.00
AG	10	2.90	2.08	1.00	6.00
AL	15	14.20	5.32	6.00	21.00
CR	15	0.80	0.68	0.00	2.00
CU	15	103.53	70.66	7.00	244.00
SI	15	27.60	17.67	7.00	67.00
SN	15	6.93	4.98	0.00	14.00
NI	15	0.87	0.52	0.00	2.00
NA	15	33.27	29.14	8.00	100.00
PB	15	293.53	150.57	15.00	484.00
B	15	198.60	146.41	6.00	424.00
MO	15	1.40	1.12	0.00	3.00

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984
2/6 CAVALRY SQUADRON FT. KNOX, KY.
MEANS AND STANDARD DEVIATIONS CALCULATED FOR WEAR METAL DATA,
FE, CU, AND AG
BY END ITEM TYPE

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TE=TRANSMISSION TCODE=M60A					
OVHHRS	193	229.63	167.24	3.00	741.00
OILCHHR	193	102.54	113.63	1.00	567.00
FE	245	316.90	236.25	5.00	998.00
AG	241	15.67	13.39	1.00	87.00
AL	245	11.33	6.34	0.00	46.00
CR	245	4.96	4.72	0.00	23.00
CU	245	334.73	225.25	1.00	998.00
SI	245	73.16	145.67	5.00	998.00
SN	245	17.81	14.17	0.00	110.00
NI	245	1.74	2.17	0.00	15.00
NA	245	26.13	36.99	3.00	370.00
PB	245	126.67	87.69	3.00	438.00
B	245	84.16	101.30	2.00	488.00
MO	245	1.05	1.19	0.00	7.00
TE=TRANSMISSION TCODE=M88A					
OVHHRS	33	258.36	247.37	22.00	738.00
OILCHHR	33	195.79	218.76	18.00	655.00
FE	41	381.22	200.18	53.00	998.00
AG	41	25.83	17.13	3.00	88.00
AL	41	12.56	11.58	3.00	78.00
CR	41	3.85	3.25	1.00	17.00
CU	41	515.46	228.07	126.00	998.00
SI	41	68.37	43.83	28.00	233.00
SN	41	34.90	20.42	7.00	93.00
NI	41	2.76	2.67	0.00	13.00
NA	41	14.63	7.61	6.00	46.00
PB	41	139.80	56.82	23.00	241.00
B	41	160.68	111.23	10.00	389.00
MO	41	4.10	2.31	0.00	9.00

APPENDIX G

Tests for Comparison of 1984 and 1985 Mean Wear Metals

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-21049 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON),
FE(IRON), CU(COPPER), AND PB(LEAD)
FOR ENGINE (M-3)
TCODE=YYA903I

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	70	61.18285714	35.23967038	4.21198622	3.00000000	187.00000000	UNEQUAL	2.5763	142.0	0.011(
1985	87	47.08045977	32.38368835	3.47189496	3.00000000	206.00000000	EQUAL	2.6001	155.0	0.010;

FOR HO: VARIANCES ARE EQUAL, F'= 1.18 WITH 69 AND 86 DF PROB > F'= 0.4567

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	69	19.68376812	34.11079685	4.10645738	1.00000000	282.00000000	UNEQUAL	2.6911	72.5	0.008!
1985	78	8.23076923	6.60956229	0.74838556	1.00000000	31.00000000	EQUAL	2.8497	145.0	0.005(

FOR HO: VARIANCES ARE EQUAL, F'= 26.63 WITH 68 AND 77 DF PROB > F'= 0.0001

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	70	16.02857143	17.71265938	2.11706772	2.00000000	135.00000000	UNEQUAL	3.6211	81.1	0.000!
1985	86	8.03488372	5.79948816	0.62537489	1.00000000	39.00000000	EQUAL	3.9364	154.0	0.000'

FOR HO: VARIANCES ARE EQUAL, F'= 9.33 WITH 69 AND 85 DF PROB > F'= 0.0001

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-21049 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON),
FE(IRON), CU(COPPER), AND PB(LEAD)
FOR ENGINE (8106, 8113, 8577)
TCODE=8C6753

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	226	92.32743363	53.62610351	3.56715534	1.00000000	310.00000000	UNEQUAL	7.8571	290.5	0.000'
1985	118	50.92372881	42.13311359	3.87866749	3.00000000	292.00000000	EQUAL	7.2921	342.0	0.000'

FOR HO: VARIANCES ARE EQUAL, F'= 1.62 WITH 225 AND 117 DF PROB > F'= 0.0039

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	225	21.82222222	30.20339451	2.01355963	1.00000000	243.00000000	UNEQUAL	3.6353	319.8	0.000:
1985	105	12.43809524	16.55173928	1.61528836	2.00000000	106.00000000	EQUAL	2.9801	328.0	0.003'

FOR HO: VARIANCES ARE EQUAL, F'= 3.33 WITH 224 AND 104 DF PROB > F'= 0.0001

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	226	22.39823009	41.67088828	2.77190626	2.00000000	421.00000000	UNEQUAL	1.7937	236.0	0.074
1985	113	14.10619469	39.32655474	3.69953107	1.00000000	298.00000000	EQUAL	1.7594	337.0	0.079

FOR HO: VARIANCES ARE EQUAL, F'= 1.12 WITH 225 AND 112 DF PROB > F'= 0.4939

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON),
FE(IRON), CU(COPPER), AND PB(LEAD)
FOR ENGINE (M35A, M49A)
TCODE=LD465-1

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	81	134.18814815	107.72036844	11.96892983	8.00000000	597.00000000	UNEQUAL	4.8803	115.5	0.000
1985	66	68.96969697	48.14112897	5.92576334	5.00000000	249.00000000	EQUAL	4.5567	145.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 5.01 WITH 80 AND 65 DF PROB > F'= 0.0001

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	81	45.01234568	80.42830562	8.93647840	1.00000000	587.00000000	UNEQUAL	0.0562	129.4	0.9561
1985	63	44.25396825	85.36259819	10.75467648	1.00000000	402.00000000	EQUAL	0.0546	142.0	0.9565

FOR HO: VARIANCES ARE EQUAL, F'= 1.13 WITH 62 AND 80 DF PROB > F'= 0.6119

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	81	41.44444444	36.44996571	4.04999619	2.00000000	179.00000000	UNEQUAL	0.4514	97.8	0.652
1985	65	37.49230769	62.58022928	7.76212213	2.00000000	355.00000000	EQUAL	0.4767	144.0	0.634

FOR HO: VARIANCES ARE EQUAL, F'= 2.95 WITH 64 AND 80 DF PROB > F'= 0.0001

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON),
FE(IRON), CU(COPPER), AND PB(LEAD)
FOR ENGINE (M52A, M54A)
TCODE=LD5465-1

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	29	124.44827586	74.42425978	13.82023809	9.00000000	312.00000000	UNEQUAL	2.8383	45.4	0.006
1985	19	71.68421053	58.36814083	12.87290693	14.00000000	226.00000000	EQUAL	2.6566	46.0	0.010

FOR HO: VARIANCES ARE EQUAL, F'= 1.87 WITH 28 AND 18 DF PROB > F'= 0.1675

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	29	61.75862069	78.32380370	14.54636522	2.00000000	352.00000000	UNEQUAL	3.0206	30.0	0.005
1985	18	17.05555556	11.60361111	2.73499737	4.00000000	44.00000000	EQUAL	2.3954	45.0	0.020

FOR HO: VARIANCES ARE EQUAL, F'= 45.56 WITH 28 AND 17 DF PROB > F'= 0.0001

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	29	61.96551724	42.80560941	7.94880212	5.00000000	175.00000000	UNEQUAL	4.1666	41.6	0.000
1985	19	20.15789474	19.07663830	4.37648097	9.00000000	85.00000000	EQUAL	3.6119	46.0	0.001

FOR HO: VARIANCES ARE EQUAL, F'= 5.03 WITH 28 AND 18 DF PROB > F'= 0.0008

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON), FE(IRON), CU(COPPER), AND PB(LEAD)
FOR ENGINE (M551)
TCODE=DD67537

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	102	169.89215686	169.36514580	16.76964830	5.00000000	926.00000000	UNEQUAL	1.4609	186.1	0.146
1985	74	129.33783784	190.30280680	22.12225198	4.00000000	998.00000000	EQUAL	1.4883	174.0	0.138

FOR HO: VARIANCES ARE EQUAL, F'= 1.26 WITH 73 AND 101 DF PROB > F'= 0.2769

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	102	16.06862745	15.90333611	1.57466472	1.00000000	111.00000000	UNEQUAL	0.5541	76.0	0.581
1985	58	13.74137931	29.65211175	3.89351302	2.00000000	220.00000000	EQUAL	0.6467	158.0	0.518

FOR HO: VARIANCES ARE EQUAL, F'= 3.48 WITH 57 AND 101 DF PROB > F'= 0.0001

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	102	15.93137255	15.33665757	1.51855538	1.00000000	108.00000000	UNEQUAL	4.6181	186.8	0.000
1985	71	8.04225352	6.59314930	0.78246287	2.00000000	38.00000000	EQUAL	4.0773	171.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 5.61 WITH 101 AND 70 DF PROB > F'= 0.0001

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON), FE(IRON), CU(COPPER), AND PB(LEAD)
FOR ENGINE (M60A, M88A)
TCODE=AVDS1790

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |
1984	261	171.72030651	144.06276119	8.91726105	4.00000000	986.00000000	UNEQUAL	5.6377	497.2	0.00
1985	269	109.98513011	115.24950125	7.02688611	13.00000000	998.00000000	EQUAL	5.6558	528.0	0.00

FOR HO: VARIANCES ARE EQUAL, F'= 1.56 WITH 260 AND 268 DF PROB > F'= 0.0003

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	261	75.96160582	98.88874123	6.12105941	1.00000000	879.00000000	UNEQUAL	5.8901	372.7	0.000
1985	269	36.02973978	47.79924044	2.91437137	4.00000000	351.00000000	EQUAL	5.9457	528.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 4.28 WITH 260 AND 268 DF PROB > F'= 0.0001

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |
1984	261	45.81992337	50.22838537	3.10905653	5.00000000	564.00000000	UNEQUAL	7.7300	332.2	0.00
1985	269	20.10408141	19.16750065	1.16866314	3.00000000	139.00000000	EQUAL	7.8177	528.0	0.00

FOR HO: VARIANCES ARE EQUAL, F'= 6.87 WITH 260 AND 268 DF PROB > F'= 0.0001

ARMY OIL ANALYSIS LABORATORY DATA
SIL-L-2104D OE/EDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON), FE(IRON), CU(COPPER), AND PB(LEAD)
FOR ENGINE (8813, 8816)
TCODE=MRC250

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	11	96.18181818	65.47338113	19.74096718	15.00000000	266.00000000	UNEQUAL	1.7197	18.0	0.102
1985	9	49.88888889	58.90319764	18.30106588	11.00000000	161.00000000	EQUAL	1.6884	18.0	0.108

FOR HO: VARIANCES ARE EQUAL, F'= 1.42 WITH 10 AND 8 DF PROB > F'= 0.6306

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	11	16.72727273	15.61486886	4.64775783	2.00000000	61.00000000	UNEQUAL	1.0866	15.9	0.293
1985	7	10.14285714	10.28637564	3.88788455	2.00000000	28.00000000	EQUAL	0.9927	16.0	0.335

FOR HO: VARIANCES ARE EQUAL, F'= 2.25 WITH 10 AND 6 DF PROB > F'= 0.3348

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	11	24.81818182	14.81767986	4.46769858	5.00000000	64.00000000	UNEQUAL	1.4716	16.3	0.160
1985	9	14.33333333	16.65082581	5.55027527	2.00000000	50.00000000	EQUAL	1.4897	18.0	0.153

FOR HO: VARIANCES ARE EQUAL, F'= 1.26 WITH 8 AND 10 DF PROB > F'= 0.7155

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON), FE(IRON), CU(COPPER), AND AG(SILVER)
FOR TRANSMISSION (M106, M113, M577)
TCODE=IX-100-1

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	89	68.00496382	35.22787833	3.73410526	10.00000000	206.00000000	UNEQUAL	0.2218	71.6	0.825
1985	49	66.16326531	53.31211087	7.61601578	10.00000000	250.00000000	EQUAL	0.2489	136.0	0.803

FOR HO: VARIANCES ARE EQUAL, F'= 2.29 WITH 48 AND 88 DF PROB > F'= 0.0008

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	89	110.53932584	63.27196999	6.70681580	3.00000000	300.00000000	UNEQUAL	2.5933	85.6	0.011
1985	49	81.48979592	75.85845439	10.83692206	7.00000000	368.00000000	EQUAL	2.7330	136.0	0.007

FOR HO: VARIANCES ARE EQUAL, F'= 1.44 WITH 48 AND 88 DF PROB > F'= 0.1612

VARIABLE: AG SILVER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	70	3.15714286	2.38130225	0.28462006	1.00000000	10.00000000	UNEQUAL	-0.1324	15.7	0.896
1985	12	3.25000000	2.22076973	0.64108100	1.00000000	9.00000000	EQUAL	-0.1259	80.0	0.900

FOR HO: VARIANCES ARE EQUAL, F'= 1.15 WITH 69 AND 11 DF PROB > F'= 0.8522

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON), FE(IRON), CU(COPPER), AND AG(SILVER)
FOR TRANSMISSION (M551)
TCODE=ITG2501A

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	76	60.61842105	45.64499762	5.23584029	6.00000000	198.00000000	UNEQUAL	4.8123	109.5	0.000
1985	52	32.19230769	19.71964131	2.73462223	7.00000000	77.00000000	EQUAL	4.2251	126.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 5.36 WITH 75 AND 51 DF PROB > F'= 0.0001

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	76	183.30263158	152.96352678	17.54611988	1.00000000	782.00000000	UNEQUAL	5.5631	100.5	0.000
1985	52	76.96153846	54.69772965	7.58521034	16.00000000	249.00000000	EQUAL	4.8025	126.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 7.82 WITH 75 AND 51 DF PROB > F'= 0.0001

VARIABLE: AG SILVER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	45	1.77777778	0.95081039	0.14173846	1.00000000	5.00000000	UNEQUAL	.	.	
1985	1	1.00000000	.	.	1.00000000	1.00000000	EQUAL	0.8091	44.0	0.422

NOTE: ALL VALUES ARE THE SAME FOR ONE CLASS LEVEL.

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON),
FE(IRON), CU(COPPER), AND AG(SILVER)
FOR TRANSMISSION (M60A)
TCODE=CB-850-64

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	245	316.89795918	236.26907363	15.09339966	5.00000000	998.00000000	UNEQUAL	3.4910	459.3	0.000
1985	306	252.23529412	187.82490153	10.73723496	22.00000000	998.00000000	EQUAL	3.5794	549.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 1.58 WITH 244 AND 305 DF PROB > F'= 0.0001

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	245	338.73061224	225.25086398	14.39078982	1.00000000	998.00000000	UNEQUAL	8.8742	384.6	0.000
1985	305	189.11803279	137.67297434	7.88313158	12.00000000	963.00000000	EQUAL	9.3282	548.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 2.68 WITH 244 AND 304 DF PROB > F'= 0.0001

VARIABLE: AG SILVER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	241	15.66804979	13.39425312	0.86279969	1.00000000	87.00000000	UNEQUAL	7.4313	332.3	0.000
1985	253	8.64822134	6.11714080	0.38458135	1.00000000	41.00000000	EQUAL	7.5507	492.8	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 4.79 WITH 240 AND 252 DF PROB > F'= 0.0001

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
2/6 CAVALRY SQUADRON FT. KNOX, KY.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON),
FE(IRON), CU(COPPER), AND AG(SILVER)
FOR TRANSMISSION (M60A)
TCODE=E1-1410-4

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	41	381.21951220	200.17698571	31.26239290	53.00000000	998.00000000	UNEQUAL	2.0021	54.1	0.050
1985	24	286.83333333	172.87509104	35.28798019	47.00000000	659.00000000	EQUAL	1.9261	63.0	0.058

FOR HO: VARIANCES ARE EQUAL, F'= 1.34 WITH 40 AND 23 DF PROB > F'= 0.4586

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	41	515.46341463	228.06622915	35.61796097	126.00000000	998.00000000	UNEQUAL	4.0329	62.6	0.000
1985	24	340.33333333	121.70336949	24.84259627	59.00000000	585.00000000	EQUAL	3.4758	63.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 3.51 WITH 40 AND 23 DF PROB > F'= 0.0021

VARIABLE: AG SILVER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	41	25.82926829	17.12878052	2.67506609	3.00000000	88.00000000	UNEQUAL	1.7925	52.9	0.078
1985	23	18.65217391	14.28797554	2.97924885	2.00000000	61.00000000	EQUAL	1.7029	62.0	0.093

FOR HO: VARIANCES ARE EQUAL, F'= 1.44 WITH 40 AND 22 DF PROB > F'= 0.3666

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON), CU(COPPER), AND PB(LEAD) FOR ENGINE (8106, 8113, 8548, 8577)
?CODE=DD8753

?TEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	1154	120.93327556	85.35474600	2.51260818	2.00000000	998.00000000	UNEQUAL	5.5137	2242.7	0.000
1985	1565	103.77188498	72.67240531	1.83701357	3.00000000	998.00000000	EQUAL	5.6483	2717.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 1.38 WITH 1153 AND 1564 DF PROB > F'= 0.0001

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	1113	19.20485175	33.63159876	1.00809121	2.00000000	507.00000000	UNEQUAL	2.0076	2038.3	0.044
1985	1544	16.76870238	26.53727808	0.67535594	2.00000000	592.00000000	EQUAL	2.0849	2655.0	0.037

FOR HO: VARIANCES ARE EQUAL, F'= 1.61 WITH 1112 AND 1543 DF PROB > F'= 0.0001

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	1137	23.50571680	42.74873580	1.26777751	2.00000000	643.00000000	UNEQUAL	4.5115	1763.6	0.000
1985	1553	17.03090792	26.50838478	0.67266198	2.00000000	564.00000000	EQUAL	4.8332	2688.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 2.60 WITH 1136 AND 1552 DF PROB > F'= 0.0001

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON), CU(COPPER), AND PB(LEAD) FOR ENGINE (8109, 8578)
?CODE=DD8771

?TEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	85	120.27058824	92.43136298	10.02558896	6.00000000	449.00000000	UNEQUAL	1.2138	146.8	0.226
1985	121	105.93388430	68.69712943	6.24519358	2.00000000	325.00000000	EQUAL	1.2769	204.0	0.203

FOR HO: VARIANCES ARE EQUAL, F'= 1.81 WITH 84 AND 120 DF PROB > F'= 0.0029

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	84	60.78571429	101.98406105	11.12737332	5.00000000	587.00000000	UNEQUAL	0.1452	185.9	0.884
1985	119	58.61344538	109.03498966	9.99522111	5.00000000	797.00000000	EQUAL	0.1436	201.0	0.886

FOR HO: VARIANCES ARE EQUAL, F'= 1.16 WITH 118 AND 83 DF PROB > F'= 0.5196

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	84	18.01190476	10.59380820	1.15587928	3.00000000	54.00000000	UNEQUAL	-1.2116	146.0	0.227
1985	118	22.13559322	36.77520368	3.20131698	2.00000000	291.00000000	EQUAL	-1.0520	200.0	0.294

FOR HO: VARIANCES ARE EQUAL, F'= 10.78 WITH 117 AND 83 DF PROB > F'= 0.0001

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON), CU(COPPER), AND PB(LEAD) FOR ENGINE (M185)
TCODE=LD5427-1

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	14	54.85714286	23.98671794	6.41072003	21.00000000	81.00000000	UNEQUAL	0.4578	7.3	0.660
1985	6	48.00000000	33.19638535	13.55236757	10.00000000	89.00000000	EQUAL	0.5231	18.0	0.607

FOR HO: VARIANCES ARE EQUAL, F'= 1.92 WITH 5 AND 13 DF PROB > F'= 0.3200

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	14	20.00000000	8.98717034	2.40192231	6.00000000	32.00000000	UNEQUAL	-0.7090	5.7	0.506
1985	6	26.66666667	22.26806383	9.09089899	9.00000000	68.00000000	EQUAL	-0.9757	18.0	0.342

FOR HO: VARIANCES ARE EQUAL, F'= 6.14 WITH 5 AND 13 DF PROB > F'= 0.0078

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	14	18.57142857	7.79264235	2.08267127	6.00000000	28.00000000	UNEQUAL	0.8809	8.0	0.404
1985	6	14.66666667	9.58471005	3.91294149	5.00000000	29.00000000	EQUAL	0.9608	18.0	0.349

FOR HO: VARIANCES ARE EQUAL, F'= 1.51 WITH 5 AND 13 DF PROB > F'= 0.5050

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON), CU(COPPER), AND PB(LEAD) FOR ENGINE (M275, M35A, M36A, M49A)
TCODE=LD465-1

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	373	99.35882359	74.93646458	3.88006306	9.00000000	467.00000000	UNEQUAL	5.7194	705.1	0.00
1985	399	72.10025063	58.79168552	2.94326566	2.00000000	449.00000000	EQUAL	5.7655	770.0	0.00

FOR HO: VARIANCES ARE EQUAL, F'= 1.62 WITH 372 AND 398 DF PROB > F'= 0.0001

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	365	25.05479452	20.24973912	1.05991979	2.00000000	257.00000000	UNEQUAL	6.6617	578.8	0.000
1985	394	16.96700508	11.75238280	0.59207649	2.00000000	108.00000000	EQUAL	6.7893	757.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 2.97 WITH 364 AND 393 DF PROB > F'= 0.0001

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	372	31.24193548	26.10027649	1.35323619	3.00000000	171.00000000	UNEQUAL	7.4376	620.6	0.00
1985	397	19.36523929	16.89151663	0.84776092	2.00000000	107.00000000	EQUAL	7.5374	767.0	0.00

FOR HO: VARIANCES ARE EQUAL, F'= 2.39 WITH 371 AND 396 DF PROB > F'= 0.0001

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON), CU(COPPER), AND PB(LEAD) FOR ENGINE (M52A, M54A, M543A)
TCODE=LDS465-1

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	218	136.64220183	116.28782580	7.87597828	3.00000000	521.00000000	UNEQUAL	6.2530	412.6	0.0001
1985	225	98.21333333	91.86779140	6.12318609	2.00000000	998.00000000	EQUAL	6.2686	441.0	0.0001

FOR HO: VARIANCES ARE EQUAL, F'= 1.60 WITH 217 AND 224 DF PROB > F'= 0.0005

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	211	30.58293839	29.76713581	2.04925414	2.00000000	295.00000000	UNEQUAL	6.1504	393.3	0.0001
1985	220	19.93181818	22.79088752	1.53656132	3.00000000	309.00000000	EQUAL	6.1812	429.0	0.0001

FOR HO: VARIANCES ARE EQUAL, F'= 1.71 WITH 210 AND 219 DF PROB > F'= 0.0001

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	216	35.69907407	39.04651012	2.65677850	2.00000000	346.00000000	UNEQUAL	6.2667	352.6	0.0001
1985	220	22.68181818	23.62752509	1.59296742	2.00000000	239.00000000	EQUAL	6.2850	434.0	0.0001

FOR HO: VARIANCES ARE EQUAL, F'= 2.73 WITH 215 AND 219 DF PROB > F'= 0.0001

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS FE(IRON), CU(COPPER), AND PB(LEAD) FOR ENGINE (M561)
TCODE=DD353

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	13	129.15384615	94.10175889	26.09913206	59.00000000	383.00000000	UNEQUAL	0.9547	13.9	0.3560
1985	72	103.27777778	61.99664285	7.30637443	6.00000000	317.00000000	EQUAL	1.2704	83.0	0.2075

FOR HO: VARIANCES ARE EQUAL, F'= 2.30 WITH 12 AND 71 DF PROB > F'= 0.0304

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	13	16.00000000	7.12974988	1.97783683	8.00000000	32.00000000	UNEQUAL	-1.8733	57.9	0.0661
1985	70	22.07142857	21.66496031	2.56798392	3.00000000	129.00000000	EQUAL	-1.0042	81.0	0.3183

FOR HO: VARIANCES ARE EQUAL, F'= 9.08 WITH 69 AND 12 DF PROB > F'= 0.0001

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	13	18.84615385	15.60366492	4.32767800	7.00000000	56.00000000	UNEQUAL	0.8038	15.0	0.4361
1985	72	15.16666667	12.66357758	1.49261693	2.00000000	65.00000000	EQUAL	0.9300	83.0	0.3551

FOR HO: VARIANCES ARE EQUAL, F'= 1.52 WITH 12 AND 71 DF PROB > F'= 0.2759

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 WEAR METALS FE(IRON), CU(COPPER), AND PB(LEAD) FOR ENGINE (M60A, M728, M88A)
TCODE=AVDS1790

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	964	123.76970954	114.76131208	3.69621298	3.00000000	987.00000000	UNEQUAL	-0.9761	1979.0	0.32
1985	1236	128.41504854	105.40258691	2.99807184	2.00000000	871.00000000	EQUAL	-0.9864	2198.0	0.32

FOR HO: VARIANCES ARE EQUAL, F'= 1.19 WITH 963 AND 1235 DF PROB > F'= 0.0050

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	959	48.23357664	80.14708347	2.58808831	3.00000000	887.00000000	UNEQUAL	4.5511	1452.4	0.000
1985	1232	34.98944805	46.70371606	1.33059560	3.00000000	771.00000000	EQUAL	4.8400	2189.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 2.94 WITH 958 AND 1231 DF PROB > F'= 0.0001

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	955	26.43855497	45.46236561	1.47112760	2.00000000	998.00000000	UNEQUAL	5.6808	1129.1	0.000
1985	1227	17.70415648	15.58310900	0.44486868	2.00000000	168.00000000	EQUAL	6.2708	2180.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 8.51 WITH 954 AND 1226 DF PROB > F'= 0.0001

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 WEAR METALS FE(IRON), CU(COPPER), AND PB(LEAD) FOR ENGINE (M813, M816, M817, M818)
TCODE=MHC250

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	132	105.65151515	72.67841798	6.32584432	5.00000000	413.00000000	UNEQUAL	6.8685	226.7	0.000
1985	145	53.97241379	49.05410064	4.07372133	3.00000000	295.00000000	EQUAL	6.9906	275.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 2.20 WITH 131 AND 144 DF PROB > F'= 0.0001

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	127	23.62519685	27.84866122	2.47116908	2.00000000	186.00000000	UNEQUAL	4.1000	168.0	0.000
1985	141	12.54609929	11.47573538	0.96663126	3.00000000	86.00000000	EQUAL	4.2556	266.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 5.89 WITH 126 AND 140 DF PROB > F'= 0.0001

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	132	27.37121212	21.30762096	1.85457295	2.00000000	116.00000000	UNEQUAL	4.6847	261.1	0.000
1985	142	16.00000000	18.66084802	1.56598291	3.00000000	161.00000000	EQUAL	4.7078	272.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 1.30 WITH 131 AND 141 DF PROB > F'= 0.1223

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 WEAR METALS
FE(IRON), CU(COPPER), AND AG(SILVER)
FOR TRANSMISSION (M106, M113, M548, M577)
TCODE='TT-100-1'

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	675	52.47259259	63.19155377	2.43228404	2.00000000	998.00000000	UNEQUAL	3.4124	1139.5	0.000
1985	1228	42.86074919	49.78525349	1.42069725	2.00000000	977.00000000	EQUAL	3.6530	1901.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 1.61 WITH 674 AND 1227 DF PROB > F'= 0.0001

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	669	50.28998505	54.32993770	2.10051675	3.00000000	481.00000000	UNEQUAL	5.5345	1114.4	0.000
1985	1229	36.88771359	42.24346320	1.20099036	2.00000000	517.00000000	EQUAL	5.9529	1896.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 1.65 WITH 668 AND 1228 DF PROB > F'= 0.0001

VARIABLE: AG SILVER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	24	4.62500000	2.97584297	0.60735975	2.00000000	11.00000000	UNEQUAL	-1.0958	42.4	0.279
1985	26	5.84615385	4.76396732	0.93429086	2.00000000	20.00000000	EQUAL	-1.0764	48.0	0.287

FOR HO: VARIANCES ARE EQUAL, F'= 2.56 WITH 25 AND 23 DF PROB > F'= 0.0264

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-21040 OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 WEAR METALS
FE(IRON), CU(COPPER), AND AG(SILVER)
FOR TRANSMISSION (M109, M578)
TCODE=G-411-2A

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	61	106.37704918	64.05028335	8.20079844	27.00000000	375.00000000	UNEQUAL	3.3381	105.0	0.001
1985	100	74.23000000	50.48689299	5.04868930	17.00000000	279.00000000	EQUAL	3.5340	159.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 1.61 WITH 60 AND 99 DF PROB > F'= 0.0357

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	60	260.23333333	180.97414055	23.36366108	35.00000000	831.00000000	UNEQUAL	3.7028	107.7	0.000
1985	100	157.13000000	151.53441820	15.15344182	5.00000000	671.00000000	EQUAL	3.8699	158.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 1.43 WITH 59 AND 99 DF PROB > F'= 0.1186

VARIABLE: AG SILVER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	59	11.67457627	5.03558349	0.65557713	3.00000000	27.00000000	UNEQUAL	5.7014	107.5	0.000
1985	85	6.96470588	4.08087018	0.44263252	2.00000000	20.00000000	EQUAL	5.9204	142.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 1.52 WITH 58 AND 84 DF PROB > F'= 0.0774

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 WEAR WEAR METALS FE(IRON), CU(COPPER), AND PB(LEAD) FOR ENGINE (M911)
TCODE=DD6792T

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	9	57.44444444	19.83753857	6.61251152	26.00000000	79.00000000	UNEQUAL	-0.5595	5.2	0.59
1985	6	82.83333333	109.96256939	44.89203097	21.00000000	301.00000000	EQUAL	-0.6887	13.0	0.50

FOR HO: VARIANCES ARE EQUAL, F'= 30.73 WITH 5 AND 8 DF PROB > F'= 0.0001

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	9	47.77777778	76.28200603	25.42733534	5.00000000	182.00000000	UNEQUAL	-0.5520	11.0	0.59
1985	6	69.83333333	75.48355229	30.81603118	5.00000000	173.00000000	EQUAL	-0.5508	13.0	0.59

FOR HO: VARIANCES ARE EQUAL, F'= 1.02 WITH 8 AND 5 DF PROB > F'= 1.0000

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	9	13.66666667	6.08152299	2.01384100	7.00000000	24.00000000	UNEQUAL	-0.1938	9.9	0.85
1985	6	14.33333333	6.83130051	2.78886676	4.00000000	22.00000000	EQUAL	-0.1990	13.0	0.84

FOR HO: VARIANCES ARE EQUAL, F'= 1.26 WITH 5 AND 8 DF PROB > F'= 0.7199

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 WEAR WEAR METALS FE(IRON), CU(COPPER), AND PB(LEAD) FOR ENGINE (M916)
TCODE=M1C400

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	5	370.20000000	362.27296339	162.01339851	151.00000000	998.00000000	UNEQUAL	1.9458	4.0	0.12
1985	3	58.00000000	21.93171220	12.66227994	35.00000000	78.00000000	EQUAL	1.4624	6.0	0.19

FOR HO: VARIANCES ARE EQUAL, F'= 272.85 WITH 4 AND 2 DF PROB > F'= 0.0073

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	5	106.20000000	85.42657666	38.20392650	9.00000000	186.00000000	UNEQUAL	2.3742	4.1	0.07
1985	3	15.00000000	6.92820323	4.00000000	11.00000000	23.00000000	EQUAL	1.7875	6.0	0.12

FOR HO: VARIANCES ARE EQUAL, F'= 152.04 WITH 4 AND 2 DF PROB > F'= 0.0131

VARIABLE: PB LEAD

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	5	102.40000000	145.56716663	65.09961597	8.00000000	357.00000000	UNEQUAL	1.3916	4.0	0.23
1985	3	11.66666667	6.35085296	3.66666667	8.00000000	19.00000000	EQUAL	1.0468	6.0	0.33

FOR HO: VARIANCES ARE EQUAL, F'= 525.37 WITH 4 AND 2 DF PROB > F'= 0.0038

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS
FE(IRON), CU(COPPER), AND AG(SILVER)
FOR TRANSMISSION (M60A, M728)
TCODE=CS-850-6A

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	829	182.27623643	144.84837042	5.03079185	2.00000000	998.00000000	UNEQUAL	3.6815	1467.5	0.0003
1985	1062	160.44632768	106.24020248	3.26006779	2.00000000	959.00000000	EQUAL	3.7790	1889.0	0.0002

FOR HO: VARIANCES ARE EQUAL, F'= 1.86 WITH 828 AND 1061 DF PROB > F'= 0.0001

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	828	275.80318010	204.93769635	7.12207728	3.00000000	998.00000000	UNEQUAL	9.8207	1359.4	0.0001
1985	1059	190.89329556	134.77579556	4.14155968	3.00000000	879.00000000	EQUAL	10.3094	1885.0	0.0001

FOR HO: VARIANCES ARE EQUAL, F'= 2.31 WITH 827 AND 1058 DF PROB > F'= 0.0001

VARIABLE: AG SILVER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T|
1984	764	20.59162304	17.10650419	0.61889160	2.00000000	121.00000000	UNEQUAL	5.8794	1390.7	0.0001
1985	962	16.19750520	12.99581559	0.41898901	2.00000000	106.00000000	EQUAL	6.0632	1724.0	0.0001

FOR HO: VARIANCES ARE EQUAL, F'= 1.73 WITH 763 AND 961 DF PROB > F'= 0.0001

ARMY OIL ANALYSIS LABORATORY DATA
MIL-L-2104D OE/HDO 15W-40 GRADE OIL FIELD VALIDATION PROGRAM
JANUARY-DECEMBER 1984 AND JANUARY-AUGUST 1985
3RD ACR FT. BLISS, TX.
TEST FOR COMPARISON OF 1984 AND 1985 MEAN WEAR METALS
FE(IRON), CU(COPPER), AND AG(SILVER)
FOR TRANSMISSION (M88A)
TCODE=XT-1410-4

TTEST PROCEDURE

VARIABLE: FE IRON

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	79	264.84810127	154.56996496	17.39047974	31.00000000	903.00000000	UNEQUAL	2.8601	154.2	0.004
1985	96	201.90625000	132.13534354	13.48600703	2.00000000	660.00000000	EQUAL	2.9039	173.0	0.004

FOR HO: VARIANCES ARE EQUAL, F'= 1.37 WITH 78 AND 95 DF PROB > F'= 0.1446

VARIABLE: CU COPPER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	79	513.50632911	296.93830290	33.40816919	14.00000000	998.00000000	UNEQUAL	6.7058	113.2	0.000
1985	96	265.00000000	157.18745095	16.04287703	2.00000000	753.00000000	EQUAL	7.0846	173.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 3.57 WITH 78 AND 95 DF PROB > F'= 0.0001

VARIABLE: AG SILVER

YEAR	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM	VARIANCES	T	DF	PROB > |T
1984	70	21.68571429	15.41668173	1.84262200	2.00000000	73.00000000	UNEQUAL	4.1200	108.2	0.000
1985	82	13.14634146	8.59388521	0.94903586	2.00000000	41.00000000	EQUAL	4.2960	150.0	0.000

FOR HO: VARIANCES ARE EQUAL, F'= 3.22 WITH 69 AND 81 DF PROB > F'= 0.0001

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